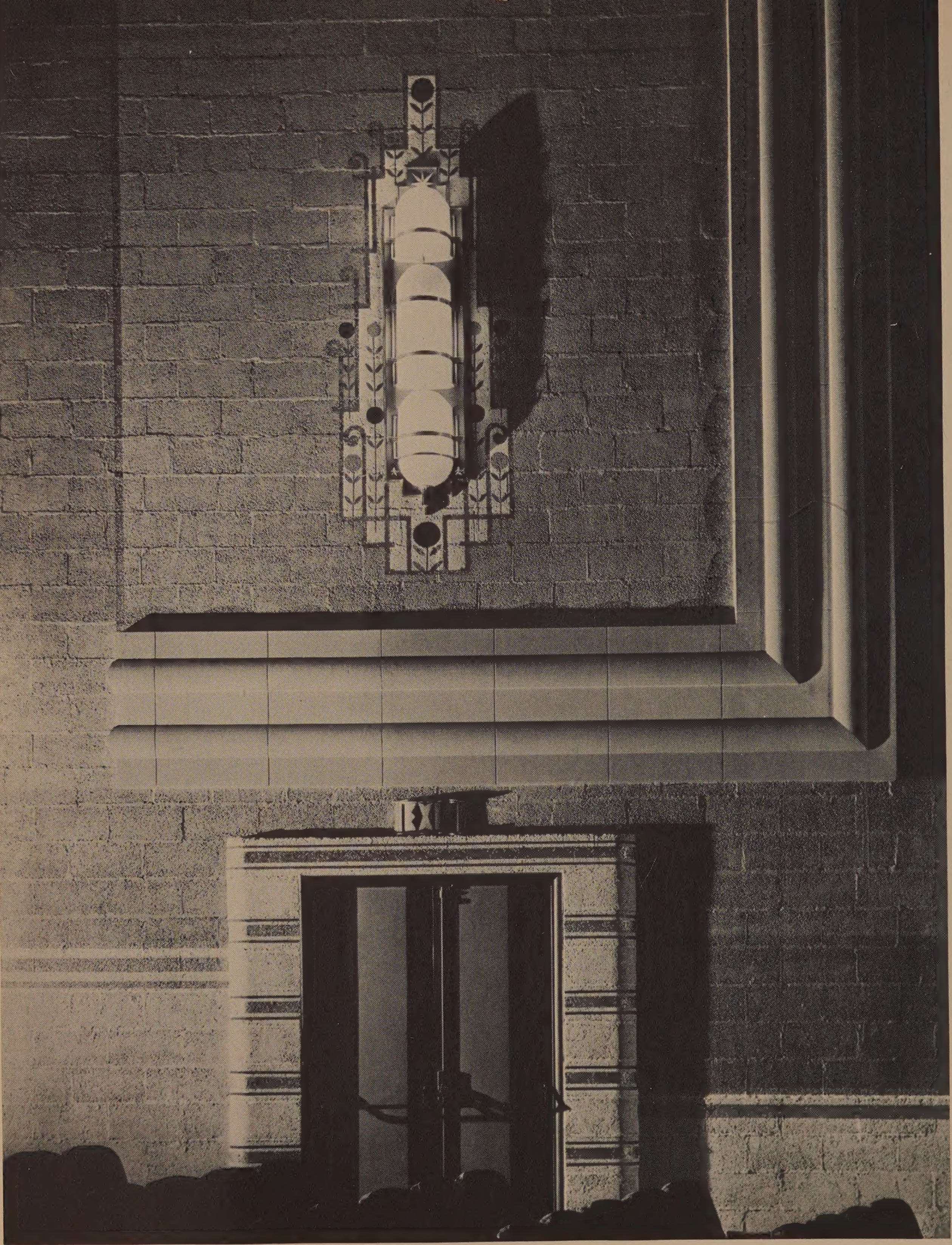
ARCHITECTURAL CONCRETE

VOLUME TWO NUMBER FOUR



WILL ROGERS THEATER—Chicago, Ill.

C. W. & Geo. L. Rapp, Inc., Architects
Lieberman & Hein, Engineers
Paschen Bros., Inc., Contractor

The Midwest's first theater in architectural concrete (see cover) was erected for Balaban & Katz Corporation. Not only has it a modern monolithic exterior, but the interior is finished with light-weight concrete masonry—selected for its acoustical and decorative advantages.

Architectural
CONCRETE

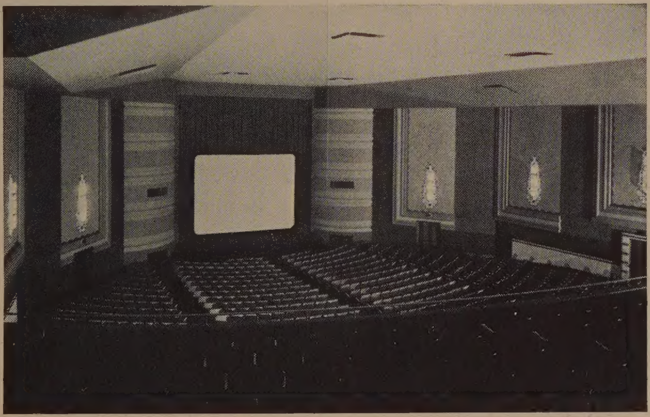
B & K's Will Rogers Theater

The Architectural Design

By George L. Rapp

SHOWMANSHIP—the act of dealing in superlatives that lends color and glamor to everything in the theatrical business—is an important factor in the design of theater buildings. A "dead" looking house attracts no customers. That is why spectaculars with foot-high letters blaze forth the names of attractions and stars, why bold colors adorn showy facades, why thousands of lamps make daylight under the box office canopy. How to use showmanship in theater planning and still maintain integrity in design is but one of the many unusual problems facing the theater architect.

Less than a decade ago, showmanship in theater design was sought in costly elegance, the use of expensive decorative materials in lavish designs to suggest impressive richness. The effectiveness of these practices has never been denied, but the pressure of current economics has so universally curtailed the cost of new theater construction that an entirely new trend in design has become necessary.

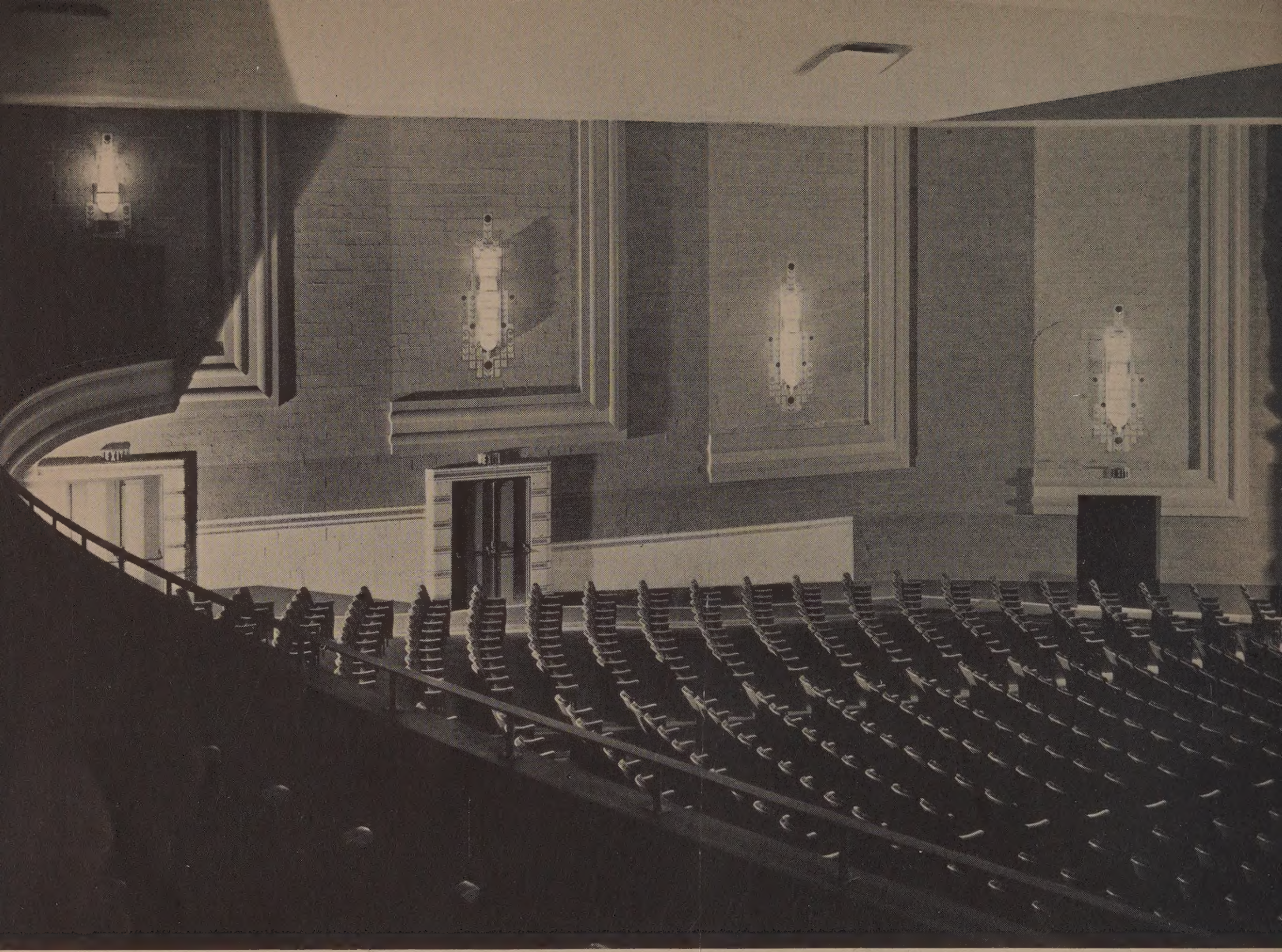


Every seat offers an unobstructed view of the screen.

Balaban and Katz' latest Chicago cinema house, the Will Rogers, was to be a fitting memorial to the late, great comedian and at the same time an efficiently planned structure that would seat 1,600. The best practices in providing maximum visibility, good acoustics and safety were required. The building was to be so constructed that the maintenance factor in operation costs—a vital consideration in theater planning—would be kept to a minimum. With a definitely limited building budget upon which to proceed, the design and construction of the Will Rogers Theater marks a wide departure in Balaban & Katz show houses and points the way toward future construction.

Located on a lot 132x126 at Belmont and Parkside in west-side Chicago, the Will Rogers is modern in design and its principal construction material is concrete. Both the design and the choice of materials were predicated upon economic requirements. The modern design, stripped of excessive decorative motifs, eliminated many costly adjuncts of conventional theater facades and interior treatment. In adapting this plan to architectural concrete, there is very little decorative detail that is not an integral part of the functional design of the building.

Before determining to use an architectural concrete exterior for important street facades, this firm made comprehensive comparative cost studies of various materials which might adapt themselves to the contemplated design. It was the conclusion, at the end of these studies, that a



Large molded plaster bands form the only ornamental design on the interior walls. Here, however, the concrete masonry is brilliantly painted with colored cement paints. Bone white chair arms make it easy for patrons to find seats when the theater is dark.

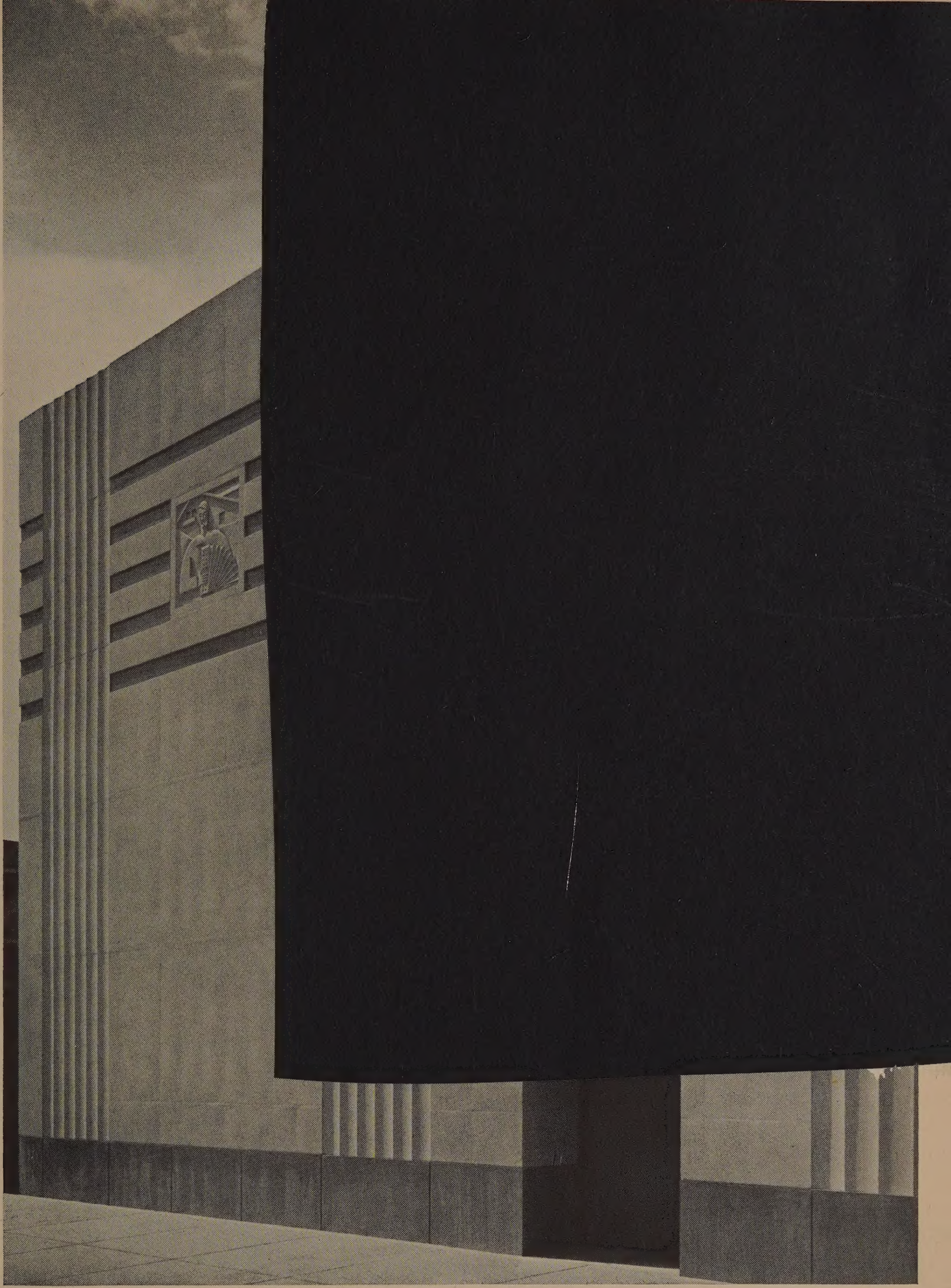
better looking building could be produced, for the same or less cost, in concrete than in any other material; and this decided the selection of architectural concrete.

Our office, however, had approached this same solution some five or six years previous in making original studies for the Southtown Theater, last of the large deluxe houses designed and built for Balaban and Katz. That structure was finished with a thick coat of cement stucco which is, in effect, a concrete slab. Today, however, after great advances have been made in the use of concrete, and more has been learned about the design of mixtures through scientific tests and experiments, there is no doubt that this material can be installed successfully in any temperature, if structures are properly designed and allowances are made for temperature expansion. The bars have been let down for architects who have long wanted a free hand to design in concrete, and with contractors amassing wider experience in the use of the material on large, complicated structures such as bridges, there is now no limit to its use.

The exterior walls of the theater are of reinforced concrete, formed in plywood panels. While detail was kept to a minimum of simply formed motifs, there are definite decorative effects achieved through the use of two tall pylons rising at each side of the entrance. The fluting of these columns is reiterated on three tall fluted reveals which give height to the long wall on Parkside Avenue. A horizontal treatment of the walls, applied rather high on both street facades, comprises wide rustications painted in green to contrast favorably with the light buff of the wall surfaces. Three ornamental plaques, depicting mummers symbolic of theatrical entertainment, are precast concrete, set in the forms and firmly anchored to the placed concrete which forms the structural walls.

Octagonal buttresses rising above the entrance portals are set with animated lights to simulate a waterfall. This part of the sign supports the vertical spectacular which carries the name of the theater in lights.

Although there was nothing unusual in the forming of



The flutes and rustications which comprise the principal detail of the exterior walls were formed against milled wood molds. The symbolic plaques were precast in concrete and placed in the wall forms. Plain surfaces were painted buff, the rustications a pleasantly contrasting shade of green.

the exterior walls, great care was exercised by the contractor, Paschen Bros., Inc., in the production of clean, smooth surfaces and sharp detail. All forms were thoroughly oiled before concrete was placed and the forms were set up according to a plan devised by the contractor and approved by the architects, which made certain that construction joints coincided with exterior decorative detail. Thus cold joints were located at reveals and at the tops of openings. The base course and certain other trim on both sides of the entrance doors is Macotta—yellow enameled steel backed up by light-weight concrete. Thus the principal elements of the exposed facades are rigid, monolithic construction.

Interior treatment was handled in quite another manner. Instead of applying acoustical plaster in rococo designs involving expensive use of several crafts, interior walls are

At each side of [illegible] buttress an illuminated sign which simulates falling water.

a straightforward application of light-weight concrete units, decorated in gay colors of paint. These light-weight units, having high acoustical value, are firmly anchored to the structural walls. Thus the interior use of concrete has three definite purposes—structural bearing strength, acoustical control, and decoration—and all for the cost of a single, simply employed material. Aside from the painting of these walls, the only other decorative treatment consists of large, precast plaster motifs which relieve the broad masonry expanses and accent the modern decoration.

Two rounded plaster columns flank the proscenium, carrying a molding design similar to that of the large panels at the side walls. The modern lighting fixtures, designed by C. Walter Warren Co., are set against a conventionalized design colorfully painted on the concrete units.

Seats are so arranged that occupants at the outside aisles have clear, undistorted view of the screen. The rise of the first floor, permitting occupants an unobstructed view over the heads of people in front, was laid out on a parabola. This system was devised by this office several years ago.

Since the safety of theater patrons is a very important matter to the management, special precautions were taken in the design to provide maximum protection. This included proper lighting to enable people to find seats but still not to disturb a clear image on the screen; specially designed carpets with light borders; and painting seat arms bone white to make them plainly visible in the dark.

The Will Rogers Theater, opened in August after being under construction approximately six months, is highly satisfactory to both the architects and the Balaban and Katz management. The selection of architectural concrete and the splendid execution of the plans in this material by the contractor have produced results well in the field of success anticipated for the project. Eminently gratifying also were the economies which permitted such a fine structure to be built for the money expended.

The Construction

By Jacob Paschen

WHEN C. W. and Geo. L. Rapp, Inc., well-known architects for masterpieces of theater construction throughout the country, decided to employ concrete for the major portion of the Will Rogers Theater, a new practice in theater construction was born in Chicago. It meant that the customary facade of brick, terra cotta, stone and marble was to be replaced by concrete designed as a distinctive architectural material with all the charm and attractiveness produced by a combination of the more commonly used materials.

Reinforced concrete walls provided a homogeneous structure impervious to the elements, an ideal insulating medium completely excluding sounds originating from external sources. A furring of light-weight concrete masonry served to augment these desirable qualities while adding an exquisite charm and beauty to the interior—a welcome contrast to the usual plaster work, and much more economical.

The walls are 10 in. thick and 34 ft. high, stiffened by pilasters about 21x42 in., all of reinforced concrete. Rugged pylons at the main entrance extend 45 ft. above the street level. The outer wall surfaces are molded into a system of flutes, plain and ornamental bands, and reveals arranged in perfect architectural balance and symmetry. To express fully this design the highest order of concrete construction was imperative.

Form designs were carefully studied. The sheathing material for the outside surface of the wall forms had to be such that no unsightly joint marks resulted. To secure true perpendicular surfaces and arrises over the 34-ft. height of the walls, the forms had to be held rigidly in position. This requirement presented exacting problems.

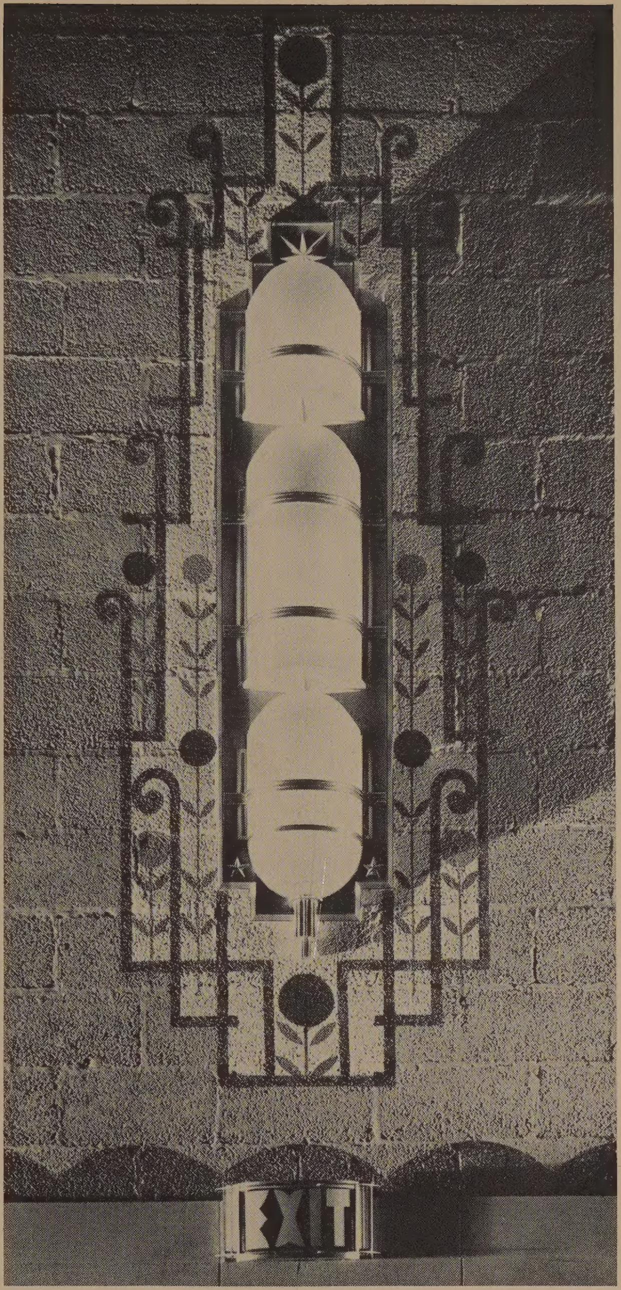
Decorative detail was accomplished by means of patterned molds fixed to the form faces. Since some of the detail consisted of horizontal recesses occurring in the design in multiples of 6 ft., it formed a device for concealing construction joints. By stopping each lift of concrete at 6-ft. intervals, joints would coincide with the recesses and be invisible except under close scrutiny. This determined the procedure for placing concrete in 6-ft. courses around the perimeter of the building, and also the selection of 4x6-ft. panel forms with plywood sheathing. Great care was exercised in matching the forms at the sides to eliminate ridges and uneven surfaces at lines of contact.

Staging and working platforms were provided by rigid scaffolding on the inside and outside of the walls. This was carefully braced and anchored to the concrete as the wall progressed. Forms were braced and tied to the scaffolding which, in turn, was immovably connected to the solid wall directly below. The concrete was cured for three days before successive stages were added.

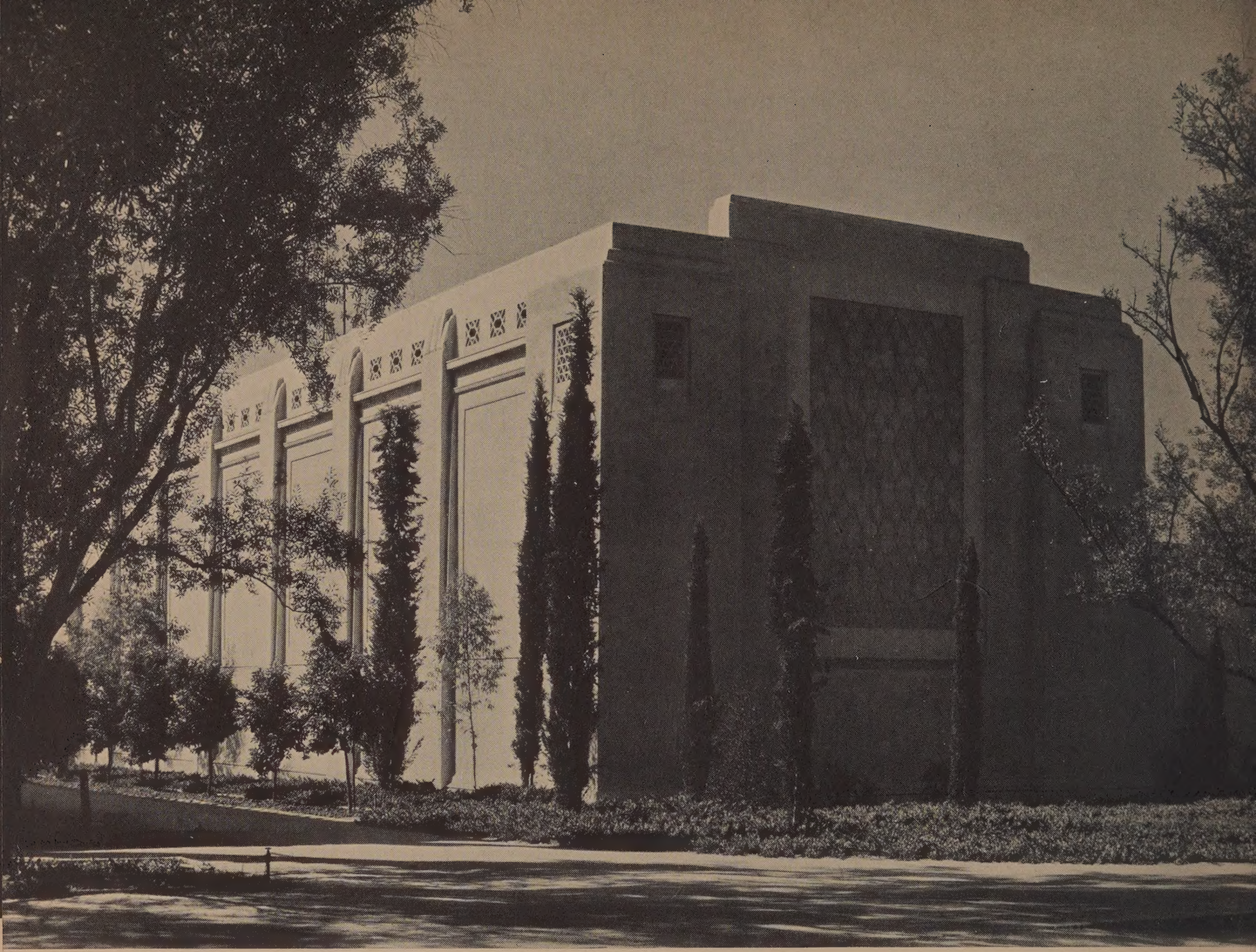
Concrete was mixed at ground level in one-minute batches. Aggregates were proportioned by weight, with water automatically measured and introduced from a tank above the mixer. A 1:2½:3½ mix with 6½ to 7 gal. water per sack of cement was used. Concrete was raised to working level in buggies on a double platform hoist and dumped from a plank runway into the forms. The mix used produced hard, smooth, stone-like surfaces. The sharpness of the detail as it emerged from the forms was due to a carefully placed and properly designed concrete mix and careful form construction.

While these operations were very particular and sometimes quite complicated, once the order of procedure was established and consecutive operations accomplished, construction progressed rapidly and smoothly to an early and successful completion.

The architects, owner and contractors are pleased and gratified with the result: the architects because their artistic expectations were realized in a truly splendid structure; the owner because of the attractiveness and durability represented in this original design which cost much less while it is every bit as imposing as the conventional order in steel and masonry. And we, the contractors, are pleased because we have built a structure of which we are proud, realizing that the construction has met with the approval of designers, owner and those who have seen the building.



Specially designed modern light fixtures are surrounded by conventionalized designs painted on the masonry. The open texture of the walls produces charming shadow effects.



Few would imagine that these classic walls enclose a workshop with a traveling crane. Designed to house the world's largest telescope mirror during processing stages. Gustave W. Iser was the architect; Byron Hill, structural engineer; Westcott Construction Co., Pasadena, contractor.

The Cradle of An Eye

By George Deris

EDITOR'S NOTE: A strange freight train, heralded by wide publicity, left Corning, N. Y. one day last spring and headed for Pasadena, Calif. It comprised locomotive, one box car, one gondola car and caboose; but as a "pay load," it was one of the most important freight trains ever made up. The load, carefully packed and jealously guarded, was a huge 200-in. disc of glass which had been poured into molds a year before and gradually allowed to cool. It was to be made up, the stories said, into the largest reflecting telescope in the world. The nation watched curiously the westward progress of this odd train in movie newsreels and daily reports and then, suddenly, its destination must have been safely reached, for little has been heard of it since.

In the accompanying article Mr. Deris tells about the destination of this precious glass disc whose vaunted importance grows with the realization of the elaborate preparations which were made for its conversion into the world's most sensitive astronomical instrument.

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DRIVING or strolling down California street in Pasadena, glancing now and again at the sunny concrete facades of the Institute of Technology, one finally comes opposite a building very likely to draw repeated glances and comment from everyone. Some passersby try to analyze the riddle of this building, or, again, others just enjoy a new satisfaction as they gaze at these simple masses which, while being as clear-cut as all they have come to call "modern," nevertheless seem charged with poetry and a suggestion of new things.

California is a land of many buildings of character. Some towers on the skyline beckon to the heavens, while others seem ready to stride on as leaders of the flock of jolly little houses clustered around their feet. Yet this self-contained mass, though not a tower, seems fraught with even greater import. It shows no windows to contact with its surroundings, but rather, with its mute procession of buttresses and up-thrust pylons flanking the patterned front, seems only concerned with guarding and working over a special and aloof task. Or, with its tight-spun wickered grilles and appearance of opening only to the sky, one might fancy it to be some Jovian cradle or cup meant to contain only the rays of the heavens.

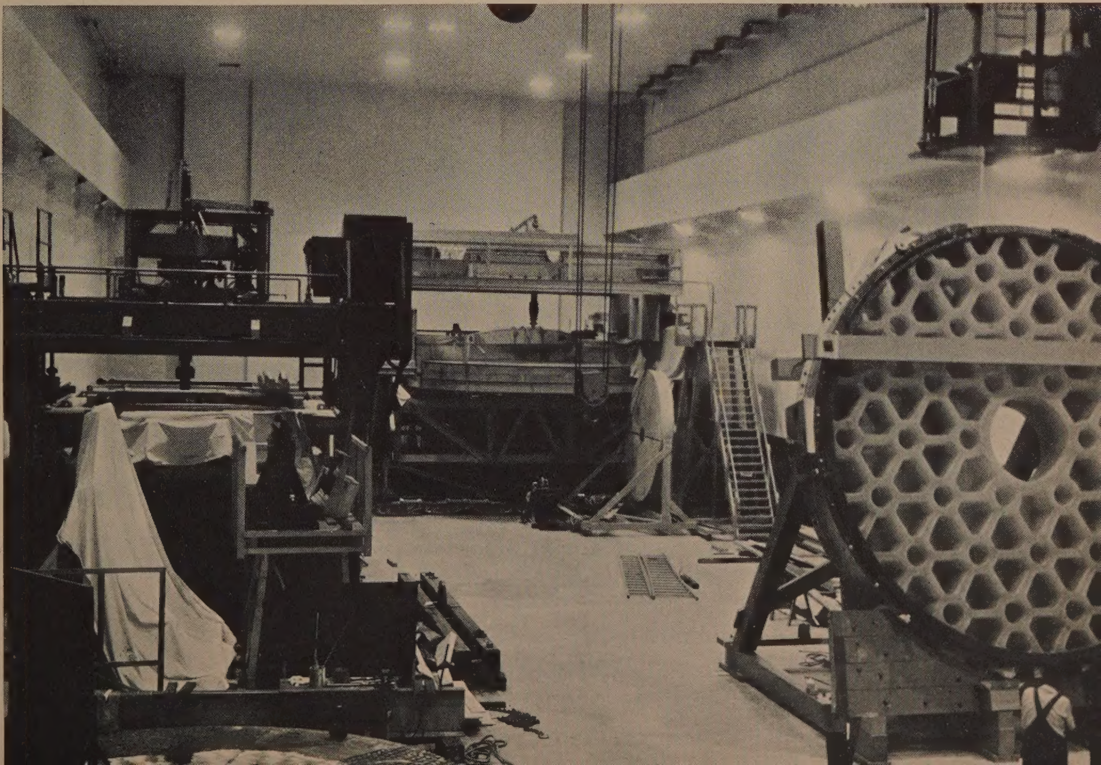
From the foregoing some may know that we are referring to the Optical Shop. Truly just a shop, seven bays long, with its traveling crane and one large working floor. This shop, however, is also able to fire the imagination. It was erected for the world's greatest marvel of glass, a 200-in. reflecting lens, destined to reveal the ultimate wonders of space. Its walls are like some strange dry dock to work upon a great vessel for exploration into spheres beyond the earth. Truly, it appears to be and is "The Cradle of an Eye."

The large fund given to the California Institute of Technology for the erection of a 200-in. reflecting telescope included an allowance for a full-sized plant wherein to grind and test the lens and other smaller lenses. The Institute requested Mr. Byron Hill, under the guidance of Prof. Martel, to handle the structural concrete design, and Mr. Gustave W. Iser to be the architect because of his excellent work in planning and supervising the construction of other recent Institute buildings.

Wherever the "giant eye" special halted along its journey, thousands gathered to see the curious caravan and its precious burden; photographers snapped and newsreel cameramen ground out the record of this westward trip for a greatly interested public.—Wide World Photo.

The Optical Shop was thereupon designed in architectural concrete with the cooperation of the engineer, architect and the Institute experts. The work was done by the Westcott Construction Co. of Pasadena and completed in scheduled time without a single extra or disagreement. This is an unusual record for a building embodying so many new features.

The layout called for a large shop floor with a 60-ton traveling crane, all to be free from vibration, and air conditioned to any constant temperature and humidity


Some idea as to the size of the telescope eye and the Optical Shop in which it will be polished for use may be derived by comparison of the size of the men in the lower right with the "eye" close by. When this photo was taken the mirror had just been unpacked from its cross-country journey and grinding machinery had not been completely installed.—Acme Photo.

desired regardless of outside weather conditions. This is an absolute necessity in producing perfect lenses. Besides this, the whole building with its subsidiary shops, offices and galleries was to be made proof against earthquakes. This combination of the highest precision of working parts and extreme endurance could lead to the selection of only one material—reinforced concrete.

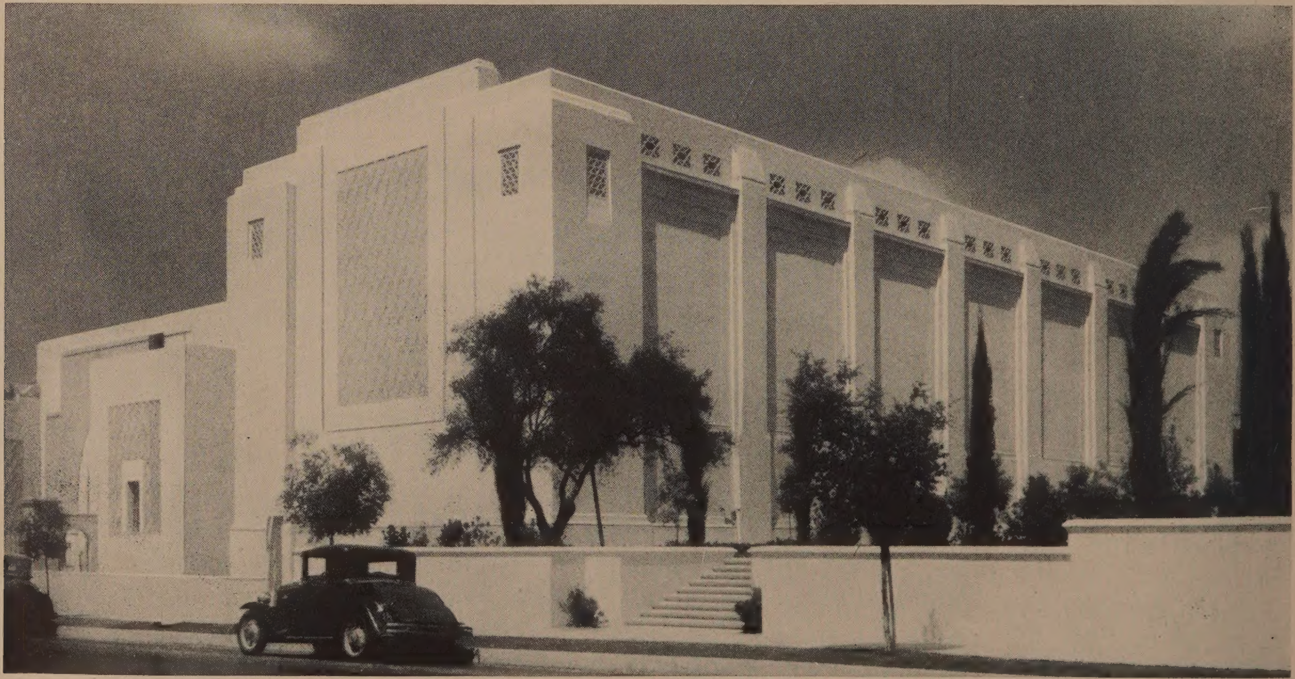
The building is one mass from foundation to roof. Vibration and heat variations under the most trying conditions have been reduced to a minimum. Many other benefits resulted from the use of reinforced concrete which could not have been obtained with other materials. The building is absolutely airtight and has remained so even through earthquakes. This permits a perfect control of temperature. The use of concrete resulted in many economies by simplifying the entire construction through the use of essentially one material for the whole building.

Using concrete also made it possible for this building to be an outstanding example of artistic expression even though only a crane shop. The sound logic in the adoption of concrete was confirmed by the great beauty achieved in the buttresses and their crestings as they hold the crane track and support the roof trusses. Every refined line or batter of wall is the direct expression of this new use of reinforced concrete.

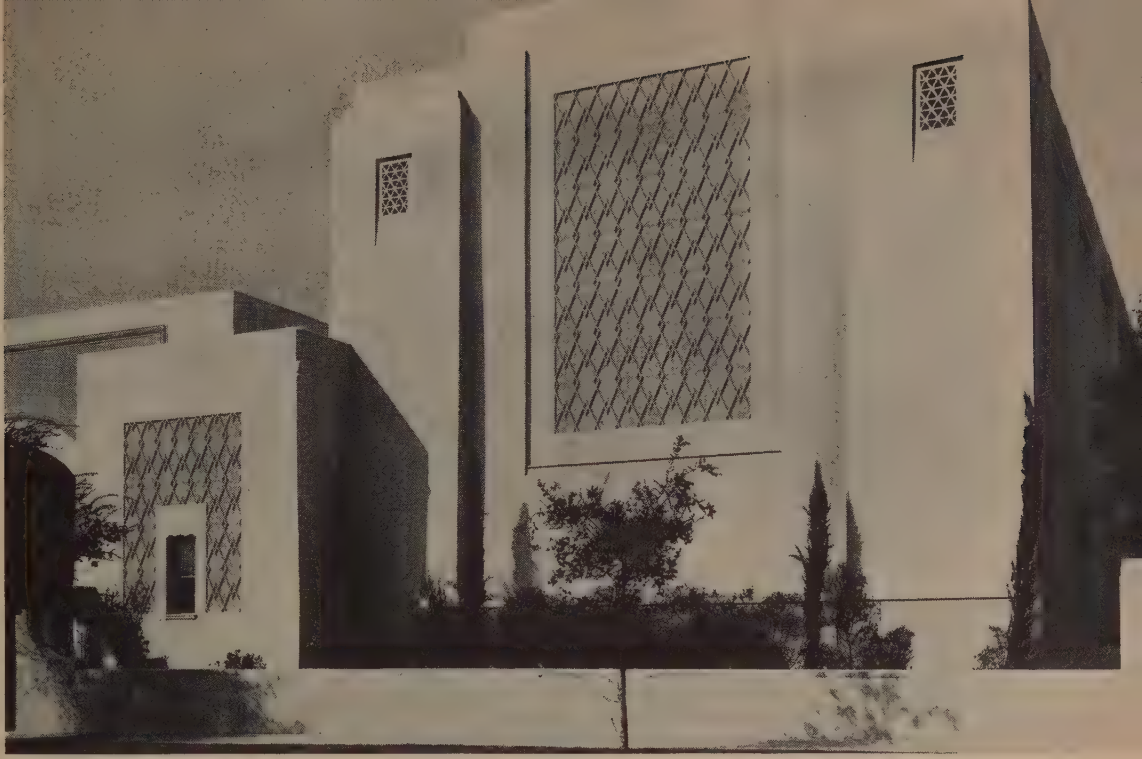
The architect handled the placing and design of this concrete building so it appears as a natural completion of this part of the Institute campus as well as expression of its special purpose. It is obvious that the excellence of the design, in the perfect joining of practical and economic functions with a poetry of style equaling the beauty of Bertram Goodhue's earlier buildings nearby, places it as a landmark in the greatest development of a new style in all history.

Of course, much has already been accomplished in the forthright use of modern materials. Just as strong timbers were shaped into the magic grace of Tudor roof trusses or high Guild halls by wizard workers of medieval centuries, so today their descendants weave steel into wonderful webs spanning harbors and armories or touching clouds with the spires of cities. Yet steel, the agile, the new-born successor to timber, remains but a skeleton. And just as the stone and clay of the earth were once raised to form soaring vaults and battlements by centuries of toiling masons, so now their descendants cast up mighty masses of enduring concrete into dams and foundations capable of resisting the elements. But plain concrete, both plastic and enduring, only replaces brick and stone, remaining heavy, strong in compression only.

As soon as the tensile powers of steel were found to combine perfectly with plastic and permanent concrete, reinforced concrete was born, making possible an architectural style greater than all others and expressing the spirit of the new era. But, even though this material was



Windowless walls are relieved at the sides by tall pylons and at the ends by interesting grilles. Thus modern and classical motifs are combined to produce what is probably the most beautiful "crane shop" in the world.



The false grilles which panel the ends of the Optical Shop are cast stone. Other cast stone pierced grilles at the top are connected with ventilating ducts.

available, still its use had to be slowly worked into that most sluggish wave of custom and society by pioneers. Also, it unfortunately had to be exploited by stylists who have long tried to accustom people to their rigid or mechanistic shapes, claiming that these shapes are necessary to the material and solve certain structural problems in their building machines. Though beams of steel and boards of lumber may serve to dictate the shape of much of the concrete work that has been done, nevertheless reinforced concrete gives possibilities of expression in all other shapes and forms.

In the case of the faster evolving automobile, people soon showed a distaste for the more obvious display of the purely mechanical parts and the cheaper flat sides, supposedly dictated by steel sheets, preferring instead shapes which suggested to the human imagination the functions of speed and comfort.

And also, when buildings such as this Optical Shop are made to acquit their more immediate functions perfectly by the use of architectural concrete, this same flesh of their sides will also be worked over to give an added imaginative beauty as in this case—beauty that accords just as closely to the wider human functions involved.

When original achievements in engineering, such as Prof. Martel's and Mr. Hill's in this case, can work in harmony with that rare combination of business acumen and poetic imagination of a true architect, such as Mr. Iser, then indeed will a new style be born out of a new age and a new material.

Optical Shop Structural Features

By Byron Hill*

ALTHOUGH the practice of erecting all permanent structures on the campus of California Institute of Technology of reinforced concrete had long been established, this material was selected for use in the Optical Shop only after a thorough investigation of other available materials. One of the greatest advantages of concrete was its high specific heat. This quality was desirable in equalizing the day and night temperatures of the grinding room in which a maximum range of temperature of 1 degree F. is permitted during grinding and testing operations.

Structural steel trusses were required for the support of the main roof, but steel columns were not necessary due to the ample size of the pilasters. The structural frame was designed for continuity, the connections between the roof trusses and the columns being designed to resist moment as well as shear.

In order to minimize the column moments resulting from the rigid connection with the long, deep roof trusses, the bottom chord was not connected until the entire dead load was applied. Thus only the live load moment was transmitted to the columns.

The bent design involved the usual vertical loads as well as eccentric crane loads and earthquake and wind loads.

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*Structural Engineer.

Variable moments of inertia in the columns and the unbalancing effect of a lower lean-to on one side of the main span added to the interest of the design. The Hardy Cross method of distributing fixed end moments was used. For horizontal loads it was found that the most satisfactory way to use this method was to apply unit loads separately at points of application of design loads, distribute moments and determine shears; and then by simultaneous equations solve for moments corresponding to shears caused by given loads. This procedure was suggested by Prof. R. R. Martel in an early discussion of the Hardy Cross paper describing his moment distribution method for analyzing continuous frames in the *Transactions*, Am. Soc. C. E.*

The main room of the building is equipped with a 50-ton crane. As pilasters within the main grinding room were objectionable and since the exterior pilasters were adequate, it was found to be economical to support the reinforced concrete crane girders from them with integral cantilevers. Heavy torsional stresses were produced by horizontal thrust of the crane and by the supporting wall on the outside of the girders. The torsional shear was resisted by diagonal box stirrups which run both ways for the full length of the building.

Due to the influence of Prof. Martel, the Institute buildings have been provided with additional reinforcement at points where weaknesses have been shown in structures following earthquakes. In accordance with this policy, wall steel was placed diagonally at 45 degrees, footings were interconnected, slabs were reinforced diagonally and the corners of openings and building corners were specially reinforced. These relatively inexpensive precautions also do much to prevent unsightly shrinkage cracks.

The floor of the main grinding room was designed to

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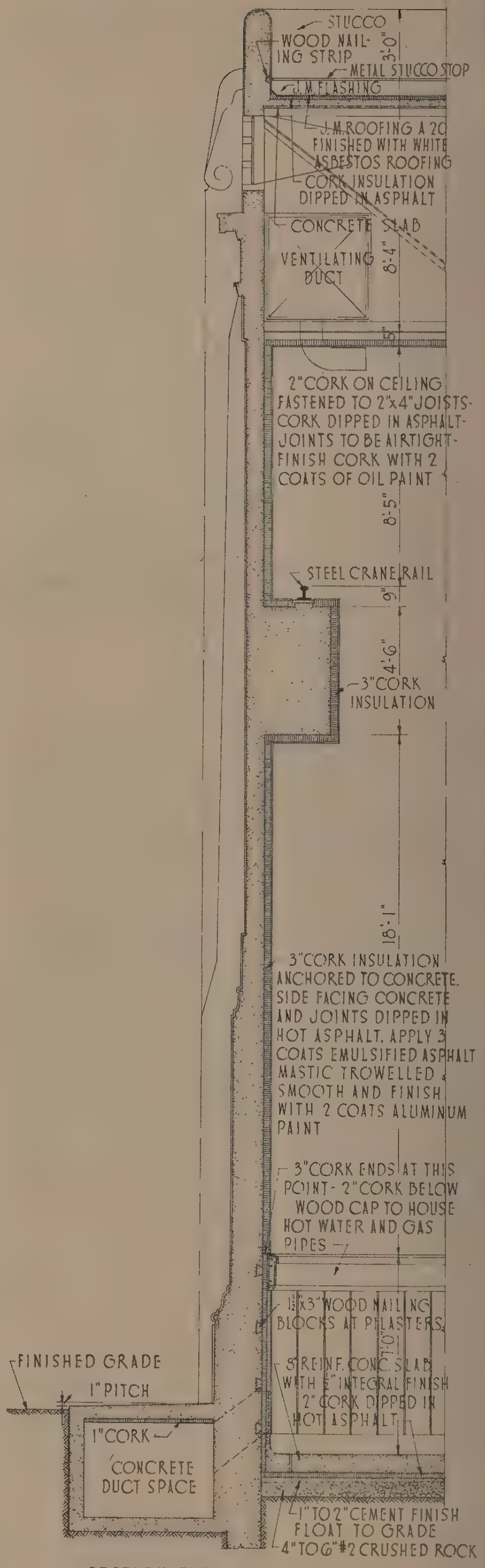
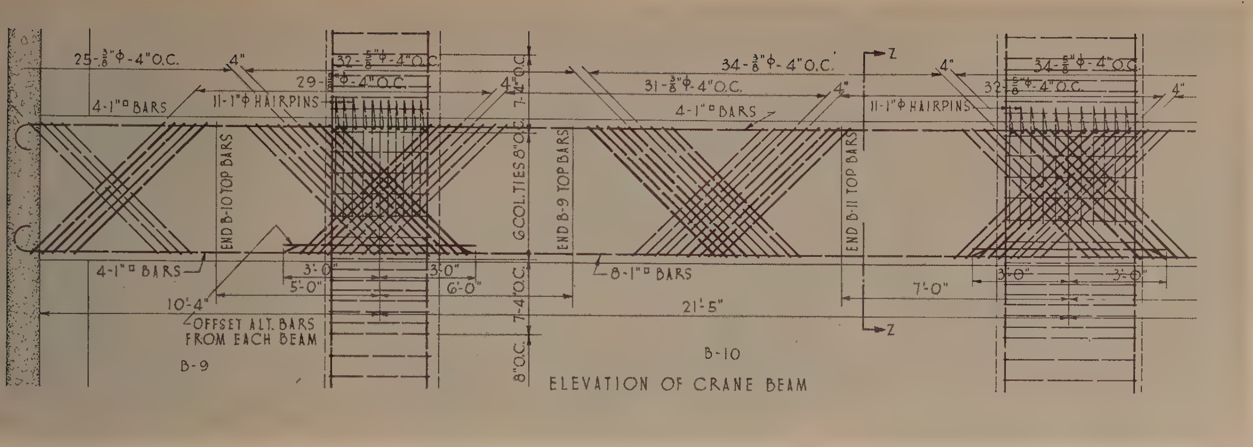
*Vol. 96 (1932), p. 60.

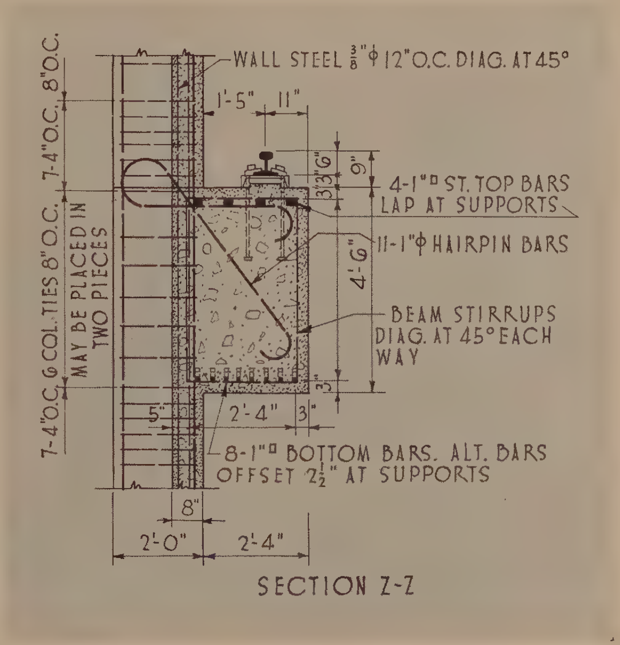
One lone window looks to the west upon a charming courtyard where lights and shadows play at patterns.


STUCCO
WOOD NAILING STRIP
3'-0"
METAL STUCCO STOP
J.M. FLASHING
J.M. ROOFING A 20 FINISHED WITH WHITE ASBESTOS ROOFING
CORK INSULATION DIPPED IN ASPHALT
CONCRETE SLAB
VENTILATING DUCT
8'-4"
5"
2" CORK ON CEILING FASTENED TO 2"x4" JOISTS-CORK DIPPED IN ASPHALT-JOINTS TO BE AIRTIGHT-FINISH CORK WITH 2 COATS OF OIL PAINT
8'-5"
STEEL CRANE RAIL
9"
4'-6"
3" CORK INSULATION
18'-1"
3" CORK INSULATION ANCHORED TO CONCRETE. SIDE FACING CONCRETE AND JOINTS DIPPED IN HOT ASPHALT. APPLY 3 COATS EMULSIFIED ASPHALT MASTIC TROWELLED SMOOTH AND FINISH WITH 2 COATS ALUMINUM PAINT
3" CORK ENDS AT THIS POINT - 2" CORK BELOW WOOD CAP TO HOUSE HOT WATER AND GAS PIPES
1½"x3" WOOD NAILING BLOCKS AT PILASTERS
7'-0"
8" REINF. CONC. SLAB WITH 1" INTEGRAL FINISH 2" CORK DIPPED IN HOT ASPHALT
FINISHED GRADE
1" PITCH
1" CORK
CONCRETE DUCT SPACE
1" TO 2" CEMENT FINISH FLOAT TO GRADE
4" TO 6" #2 CRUSHED ROCK

SECTION THROUGH TYPICAL BAY
ON EAST ELEVATION



ELEVATION OF CRANE BEAM


WALL STEEL ⅜"φ 12"O.C. DIAG. AT 45°
1'-5"
11"
9"
3'-6"
3'3"
4-1"□ ST. TOP BARS LAP AT SUPPORTS
11-1"φ HAIRPIN BARS
4'-6"
BEAM STIRRUPS DIAG. AT 45° EACH WAY
3"
5"
2'-4"
3"
8-1"□ BOTTOM BARS. ALT. BARS OFFSET 2½" AT SUPPORTS
8"
2'-0"
2'-4"
7-4"O.C. 6 COL. TIES 8" O.C. 7-4"O.C. 8"O.C.
MAY BE PLACED IN TWO PIECES

SECTION Z-Z

resist heat transmission and to dampen ground vibration which would be particularly objectionable during the testing operations. As the floor was required to support heavy concentrated loads, its isolation was quite a problem. A layer of coarse crushed rock several inches thick was placed first and rolled with a heavy roller. The surface of the crushed rock was then sealed with cement mortar and floated. Two inches of cork was then laid and on top of the cork three inches of dry sand was placed to act with the cork as a cushion for the 8-in. heavily reinforced concrete slab. The floor cork was made continuous with the wall insulation and the floor slab was isolated from the walls by expansion joints.

The outer walls were insulated by lining the inside face with 3 in. of sheet cork. The cork was placed against the inside form and the concrete placed against it. Bond was increased by inserting galvanized spikes into the cork at various angles, the heads being embedded in the concrete.

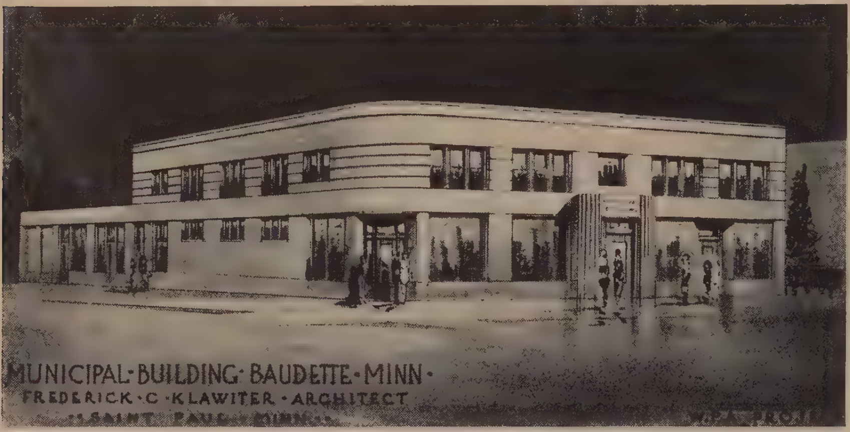
The diagonal stirrups of the crane girders made a tight cage from one end of the building to the other. The cantilever bars at each column made passage within this cage rather difficult. As a man was required inside for spading during the placement of the concrete which took all day, he stayed in for the entire day, taking water and lunch through the 4-in. square openings between the stirrups.

In order to avoid a construction joint at the bottom chord of the roof trusses, they were supported from the top of the crane girders by wood shores, and the walls and roof slab were cast in one continuous run.

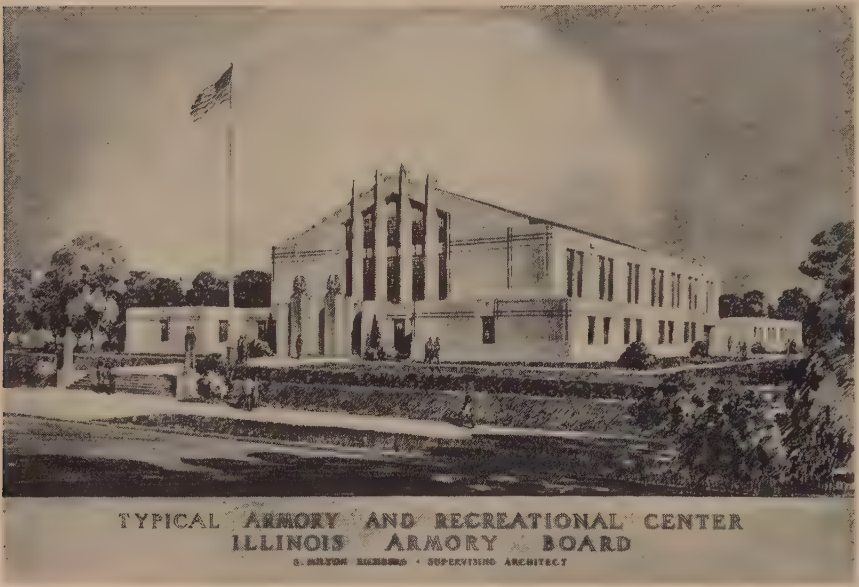
Transit-mixed concrete was used with general satisfaction. The mix contained 5.4 sacks of cement per cubic yard of concrete. One-inch maximum size coarse aggregate was used and about 40 per cent of the total volume of aggregates was sand passing a No. 4 sieve. Blending sand passing a No. 28 sieve comprised about 20 per cent of the total amount of sand. The concrete in the walls had a slump of 4 to 6 in. and in the beams a 3 to 4-in. slump concrete was used. Tests showed compressive strengths around 3,000 p.s.i. at 28 days. Internal vibrators were used and excellent compaction and good surfaces were obtained with reasonably dry concrete.

In the design of this building the architect and engineer worked in the same room in such harmony that all the structural features required were used in the architectural design and, with the exception of a little ornamentation, all the architectural features were effectively used in the structural design. It is believed that this cooperation was partially responsible for the outstanding beauty of the building.

File 10-7-1 Being Letters, Notes and Advices About ARCHITECTURAL CONCRETE


MUNICIPAL·BUILDING·BAUDETTE·MINN·
FREDERICK·C·KLAWITER·ARCHITECT
SAINT PAUL MINN
W.P.A. PROJ

Project for Municipal Building, Baudette, Minn. Frederick C. Klawiter; architect.


TYPICAL ARMORY AND RECREATIONAL CENTER
ILLINOIS ARMORY BOARD
S. MILTON EICHBERG · SUPERVISING ARCHITECT

Design for armory, typical of 15 similar structures to be erected of architectural concrete for the Illinois National Guard.

IT'S been several months since we have been able, due to space reasons, to present a group of the splendid new jobs that continually come to the attention of File 10-7-1. But this time we have saved room for seven renderings of new projects; and you must agree that they deserve the space.

• •

Frederick C. Klawiter, St. Paul architect, who has been here before in connection with a municipal building at Roseau, Minn., comes again with a city building for Baudette, Minn. This one is a WPA project, too.

• •

The sketch of the Illinois armory shown here is typical of 15 new armories now being erected all over that state. Of similar plan, all 15 were designed by the Illinois National Guard Armory Board. S. Milton Eichberg is supervising architect. All are monolithic concrete.

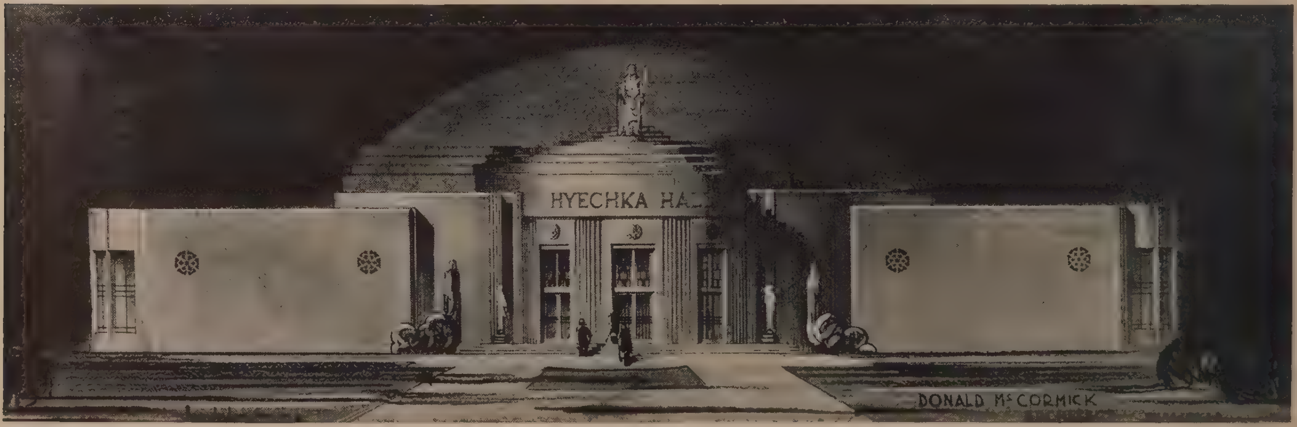
• •

Music Hall

A PWA grant of $35,000 and $43,000 raised by the Hyechka Club of Tulsa, Okla., assure the erection shortly of the beautiful Tulsa Municipal Concert Hall shown here. Architectural studies made by Donald McCormick, Tulsa architect, were aimed to express the spirit of music from Chopin to Gershwin. Mr. McCormick's excellent project will be expressed in architectural concrete.

• •

Among the scores of new post office buildings planned and under construction by the Treasury Department are several excellent examples of architectural concrete design. The



Design for $78,000 concert hall to be erected soon in Tulsa, Okla. Donald McCormick, architect.

Gary, Ind., will have a new architectural concrete post office building. Howard L. Cheney, consulting architect.

latest, now under construction at Gary, Ind., was designed by the Treasury Department, Procurement Division. Howard L. Cheney is the consulting architect. Henke Construction Co. is the contractor.

• •

Ohio High School

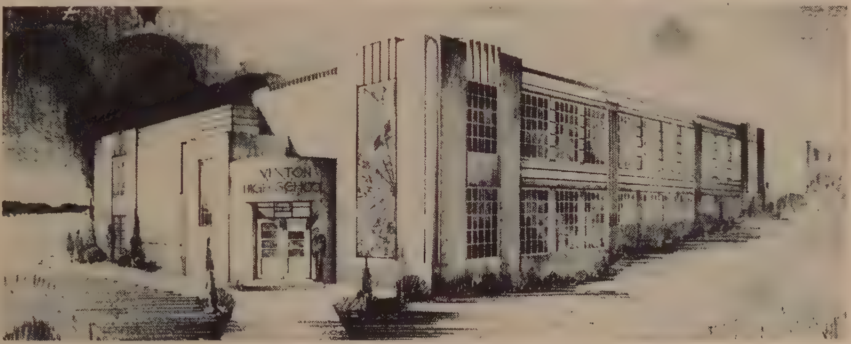
Modern lines and masses in concrete were selected for the new high school building now being erected at Vinton, Ohio. Harsh & Davies, Columbus, are the architects; Aultman-Coady Co., also of Columbus, is the contractor. A PWA grant of $14,598 will help defray the total estimated cost of $26,000.

• •

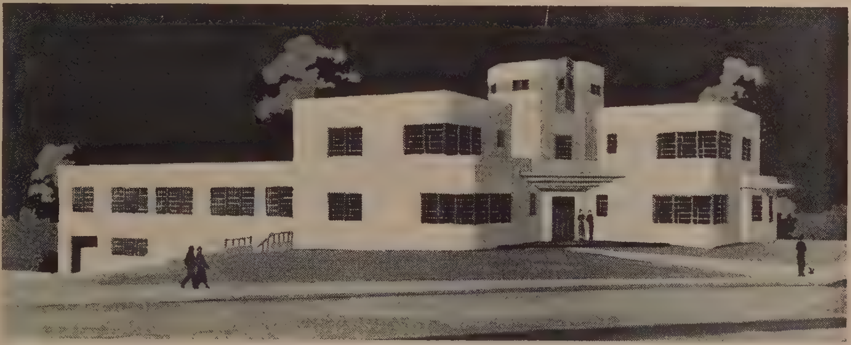
Leon County, Fla., whose seat is Tallahassee, will soon have a new jail of such beauty that one would never suspect its purpose. M. Leo Elliot, Inc., is the architect and T. A. Monk, the contractor.

• •

Malibu Beach, in the Dorchester District of Boston, Mass., will have one of the most modern bath houses in the world when the new $64,800 structure is completed. John M. Gray, Boston architect, designed this large (230x48 ft.) building and the G. L. & C. Construction Co. of Boston is the contractor.



Modern is the word for the new high school at Vinton, Ohio.



Architect Elliot's design for Tallahassee, Fla., jail.

Design for Malibu Beach bath house, Dorchester District of Boston, Mass. John M. Gray, architect.

Architectural CONCRETE

ARCHITECT · ENGINEER · CONTRACTOR

IN THIS ISSUE

A new trend in Midwest theater construction is predicted (page 3) by GEORGE L. RAPP . . . What JACOB PASCHEN, the contractor, thinks (page 6) about Will Rogers Theater . . . The end of a long ride for a 200-in. glass disc is described (page 8) by GEORGE DERIS . . . . Underneath a classic exterior BYRON HILL finds (page 11) a CRANE SHOP . . . . After all these months, another dose of FILE 10-7-1 (page 14) . . . . and ALWAYS a new sheet (pages 17-20) for your A.I.A. Files . . . . One had money, another had land; now Colorado Springs has a FINE ARTS CENTER says (page 21) JOHN GAW MEEM . . . . A Houston print shop primps (page 26) and uses an architect, JOSEPH FINGER, in the process . . . . Battles rage again on the floors (page 29) of the Texas Capitol . . . . You can't escape it, Guadalupe Jail has gone monolithic (page 33) says J. W. BERETTA.

Published by
PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue
Chicago

Architects for Industry

Elsewhere on these pages are typical examples of the new beauty that is being built into modern industrial structures. The crane shop at California Institute of Technology, which looks like a modern version of a Greek temple, may not be indicative of this current trend, but its beauty is significant of the possibilities to enhance old and familiar structural forms.

More nearly prototypes of what we may expect when industry starts building, however, are the print shop at Houston, Texas, and the tool shop at Detroit, as revealed on the back cover. No back street eye-sores are these. They stand proudly in the roads where the most people pass, and they compete with the best buildings around them for favorable observation. To give them dignity, respectability and charm was no great task—for when the owners decided that good looking buildings were an asset to their business, architects were commissioned to prepare designs. A forward step of great significance.

According to many statements that have not been denied, industry lags far behind its modern requirements for machinery and space facilities. If this is true, great opportunities lie ahead for architects—for the new industrial architecture will demand the services of many when the value of well-designed buildings is brought home to all industrialists.

Already architects previously engaged in other types of planning have turned their talents toward industrial structures. They find here an intriguing new form of architectural expression, an opportunity to create beauty where beauty was not considered essential before. Since industrial areas influence much larger urban areas surrounding them, it is conceivable that the architects of tomorrow's factories and shops will be responsible for the appearance of tomorrow's cities and towns.

CONSTRUCTION JOINTS

CONSTRUCTION joints are stopping places in the process of placing concrete and are necessary because of the impracticability of building forms for an entire structure and placing the concrete in one continuous operation. They should not be confused with expansion joints which are provided in large structures to allow for movement due to expansion and contraction.

Careful attention in locating and making construction joints in architectural concrete is required to give the perfection of finish that is so much desired. This is particularly true of horizontal joints because usually they cannot be concealed as readily as vertical joints. When properly made, construction joints do not detract from the appearance nor interfere with the monolithic nature of the structure. A well-made construction joint at the head of a window is shown in Fig. 1. It is quite inconspicuous even in the construction view shown and after the wall is cleaned or painted would be invisible.

Location of Joints

Construction joints should be located where they will be least noticeable, where they will fit into the architectural design, and at places to facilitate the construction of forms and placing of concrete. To leave their location to chance or convenience but with little consideration of their effect on the appearance of the completed structure is a practice to be avoided. Joints should be indicated on the plans, or their location decided upon by conference between the architect and the contractor, and prohibited at any other place.

Generally it is impracticable to place concrete to a height greater than one story and this fact should be recognized when locating joints. In many cases, horizontal bands of ornamentation, ledges or other architectural features at story heights provide excellent places for construction joints and when so located the joints will be concealed. In other cases, horizontal joints may be located in line with window heads or sills or both. The joints are then shortened by the width of the openings and follow the lines created by the openings.

When horizontal rustications are used, the problem is relatively simple, as they provide excellent places for the joints. If *V*-strips are used, the joints should occur at the point of the *V*. If rectangular or slightly beveled strips are used to form rustications, the joints should occur at the top edge of the inner face of the strip, as illustrated in Fig. 2, to avoid a ragged, irregular arris.

Vertical joints are rarely necessary in small structures. In larger structures they can nearly always be located at re-entrant angles of walls, at edges of pilasters or at other places where they will be effectively concealed. At re-entrant angles they may be concealed as indicated in Figs. 5 and 6 and are made weathertight by lapping the joint as shown. Occasionally, vertical joints must be made in flat wall surfaces. Where this is necessary, a copper strip may be placed in the joint to insure weathertightness, although such weather seals are frequently omitted without causing trouble. Vertical joints in flat surfaces as shown in Fig. 7 are made essentially the same as horizontal joints described below in detail.

Tight Forms at Joints

At construction joints, the forms are usually removed and re-erected for the next lift of concrete. The face form must be held tight against the hardened concrete at all points along the joint to prevent leakage of mortar which would not only cause staining of the concrete below, but would also cause an offset at the joint. The form should

FIG. 1

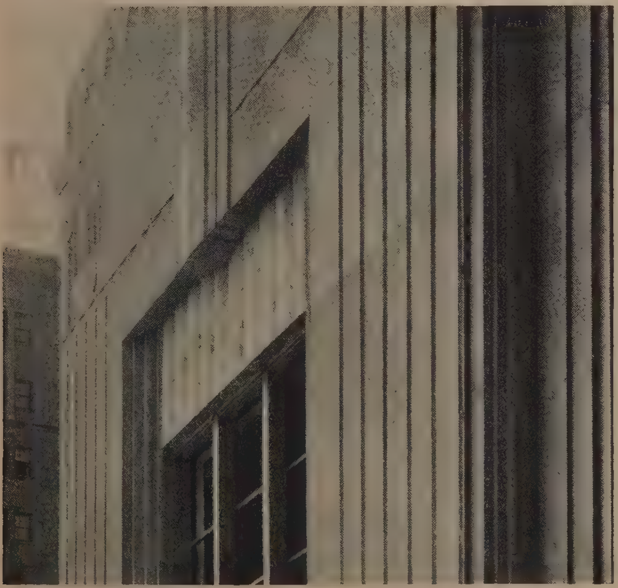
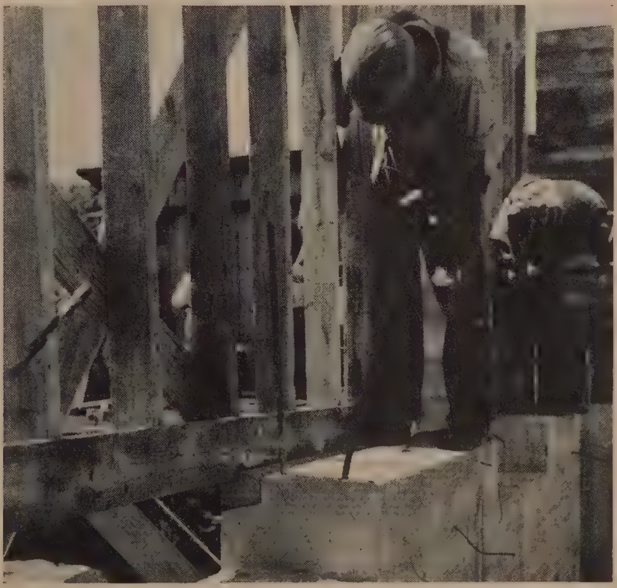


FIG. 2



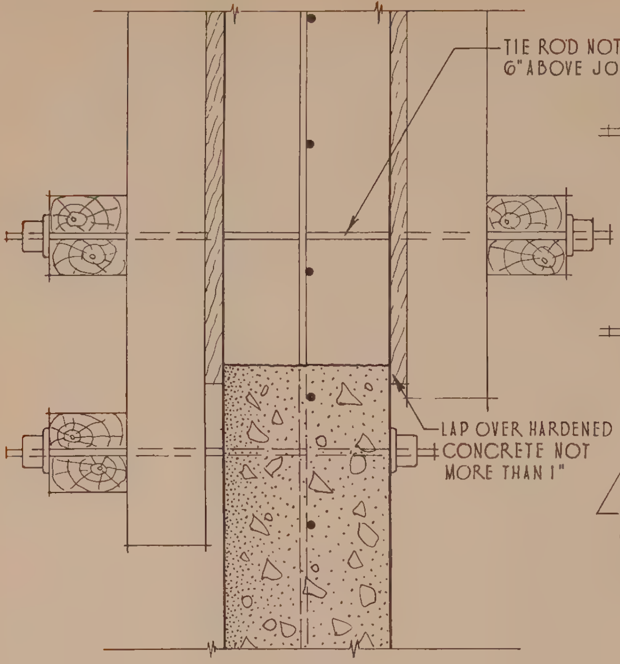


FIG. 3 b

TYPICAL HORIZONTAL CONSTRUCTION JOINT
SECOND STAGE

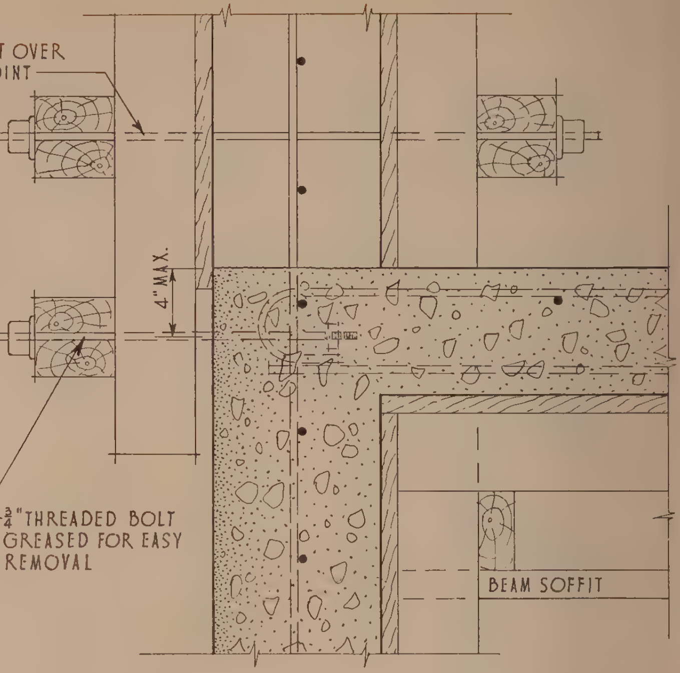


FIG. 4 b

CONSTRUCTION JOINT AT FLOOR LEVEL
SECOND STAGE

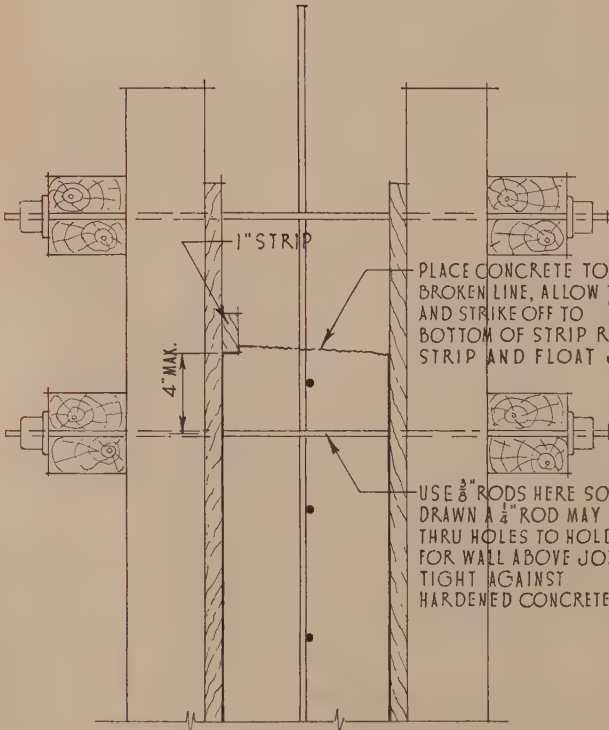


FIG. 3 a

TYPICAL HORIZONTAL CONSTRUCTION JOINT
FIRST STAGE

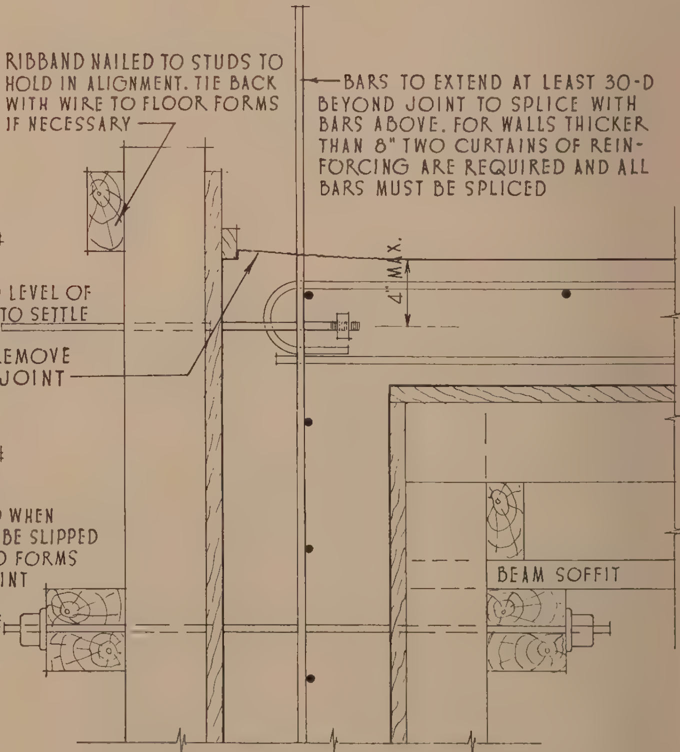

RIBBAND NAILED TO STUDS TO
HOLD IN ALIGNMENT. TIE BACK
WITH WIRE TO FLOOR FORMS
IF NECESSARY
BARS TO EXTEND AT LEAST 30-D
BEYOND JOINT TO SPLICE WITH
BARS ABOVE. FOR WALLS THICKER
THAN 8" TWO CURTAINS OF REIN-
FORCING ARE REQUIRED AND ALL
BARS MUST BE SPLICED
4" MAX.
BEAM SOFFIT

FIG. 4 a

CONSTRUCTION JOINT AT FLOOR LEVEL
FIRST STAGE

HORIZONTAL CONSTRUCTION JOINTS

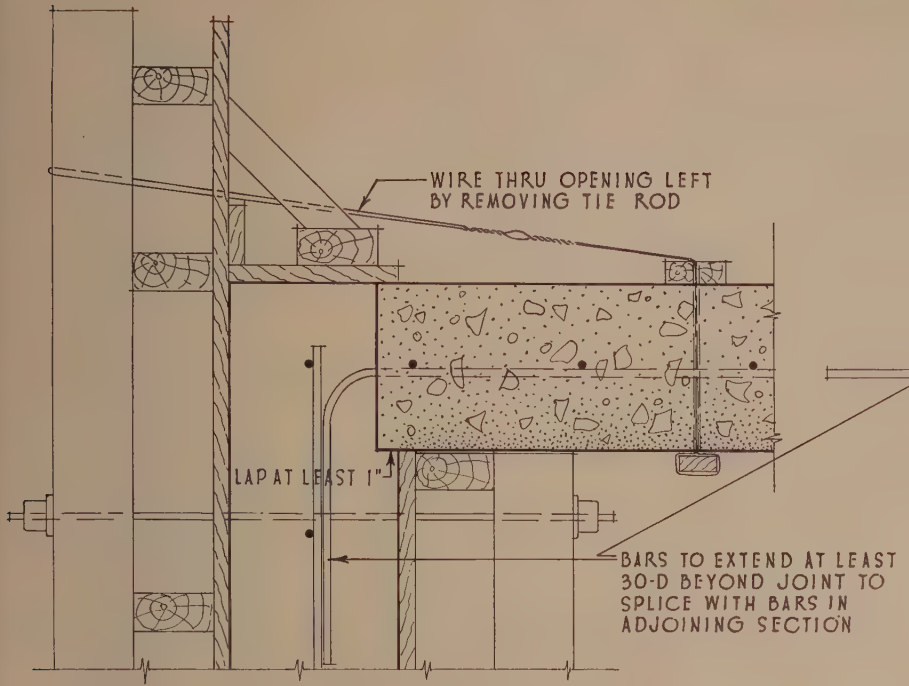

WIRE THRU OPENING LEFT BY REMOVING TIE ROD
LAP AT LEAST 1"
BARS TO EXTEND AT LEAST 30-D BEYOND JOINT TO SPLICE WITH BARS IN ADJOINING SECTION

FIG. 5b

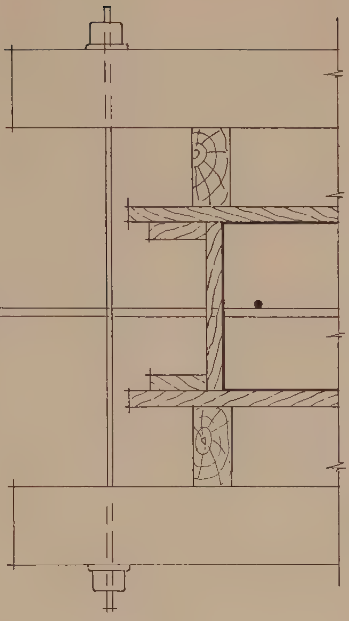


FIG. 5a

FORMS ERECTED FOR FIRST STAGE AND STRIPPED BEFORE FORMS FOR SECOND SECTION ARE ERECTED

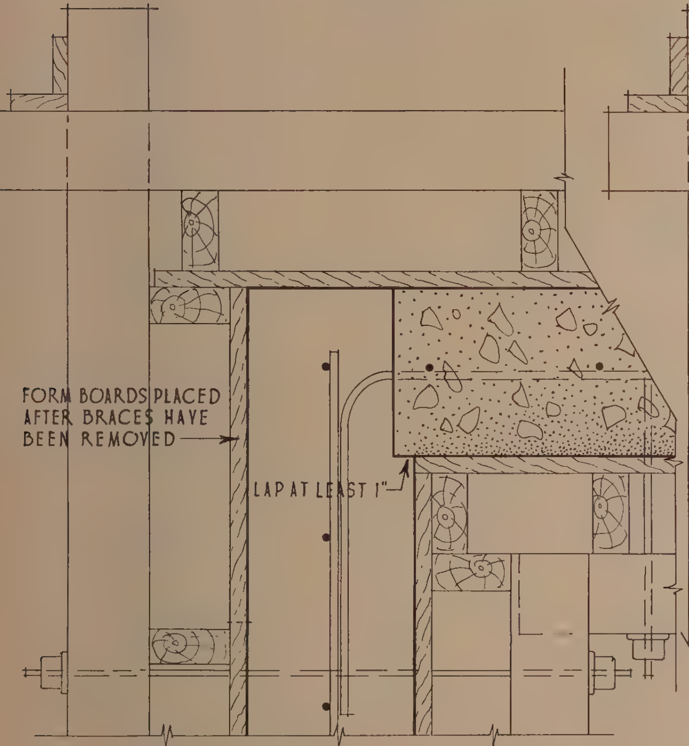


FIG. 6b

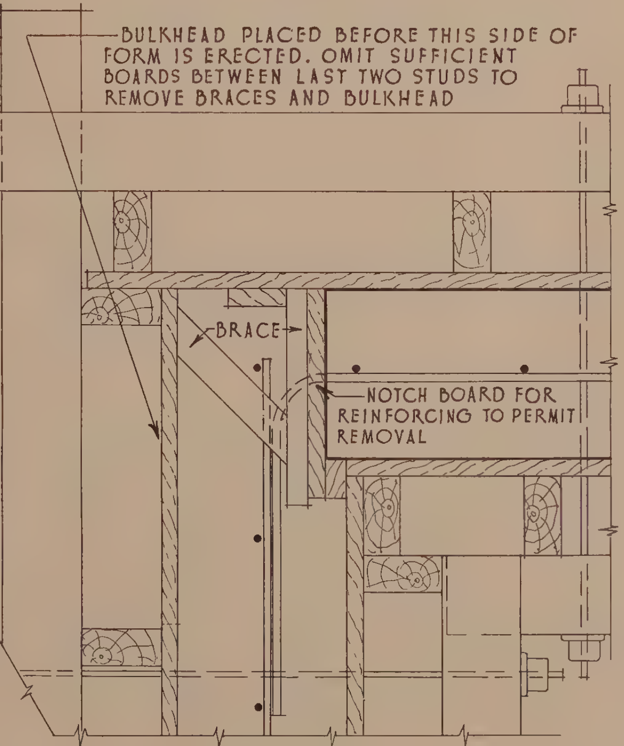

BULKHEAD PLACED BEFORE THIS SIDE OF FORM IS ERECTED. OMIT SUFFICIENT BOARDS BETWEEN LAST TWO STUDS TO REMOVE BRACES AND BULKHEAD
BRACE
NOTCH BOARD FOR REINFORCING TO PERMIT REMOVAL

FIG. 6a

FORMS ERECTED FOR FIRST AND SECOND STAGES AT SAME TIME. BULKHEAD REMOVED AFTER CONCRETE IN FIRST SECTION OF WALL HAS HARDENED. ALL FORMS STRIPPED AT ONE TIME

VERTICAL CONSTRUCTION JOINT AT RE-ENTRANT CORNER

be bolted tightly against the hardened concrete at the time of erection. This will prevent sawdust, dirt or other debris from accumulating between the form and the hardened concrete which would prevent tightening later.

There should be a row of tie rods about 4 in. below a horizontal construction joint as shown in Fig. 3a and b. This will be close enough to secure a tight fit between the form and hardened concrete, yet far enough away to prevent damage to the upper edge of concrete. When these tie rods are withdrawn from the lower section of concrete they may be replaced by rods ⅛ in. smaller in diameter for fastening the form above. When joints are provided at floor levels it is usually impossible to provide ties through the wall 4 in. below the joint. In this case bolts threaded at both ends, with a nut at the inner end of each, may be provided as indicated in Fig. 4a and b. When the bolt is removed, the nut remains embedded in the concrete. The forms for the wall above the joint should lap over the joint as little as possible and still make a tight joint; generally a 1-in. lap is about right.

Joints Should Be Level

Horizontal joints should be straight and level. These results can be secured by nailing a 1-in. board to the inside of the face form where the joint is to occur, providing there is not a rustication strip or some other detail at the joint level to mark the line. Concrete is then placed to a level about ½ in. above the bottom edge of this strip. About an hour later any laitance which has formed on the top surface and excess concrete are removed with a float. The strip is then removed and any irregularities in the joint line are leveled off.

Where ordinary sheathing lumber is used for the face forms, the construction joint should coincide with a joint between the boards. Where form lining is used, the construction joint should coincide with a joint in the lining.

Avoid Water Gain

The top layer of concrete below a construction joint or other stopping place should be stiff enough so that water and laitance will not come to the surface. As the top of the form is approached it is much easier to spade and compact the concrete than near the bottom of the form. There is often a tendency to spade the top layer more than necessary and this produces separation of the materials. Where practicable, it is advisable to interrupt placing concrete a foot or so below a construction joint before placing the last layer, to permit the concrete to settle. If excess water rises to the surface, this should be removed before proceeding with the last layer.

When concreting is to be resumed at a construction joint, the hardened concrete should be cleaned and saturated. The first 4 or 5 in. of the next lift should consist of concrete batches containing about one-half as much coarse aggregate as in the regular mix, the other proportions remaining the same. This will give a plastic concrete easily placed and will reduce the tendency for stone pockets to form at the bottom of the layer.

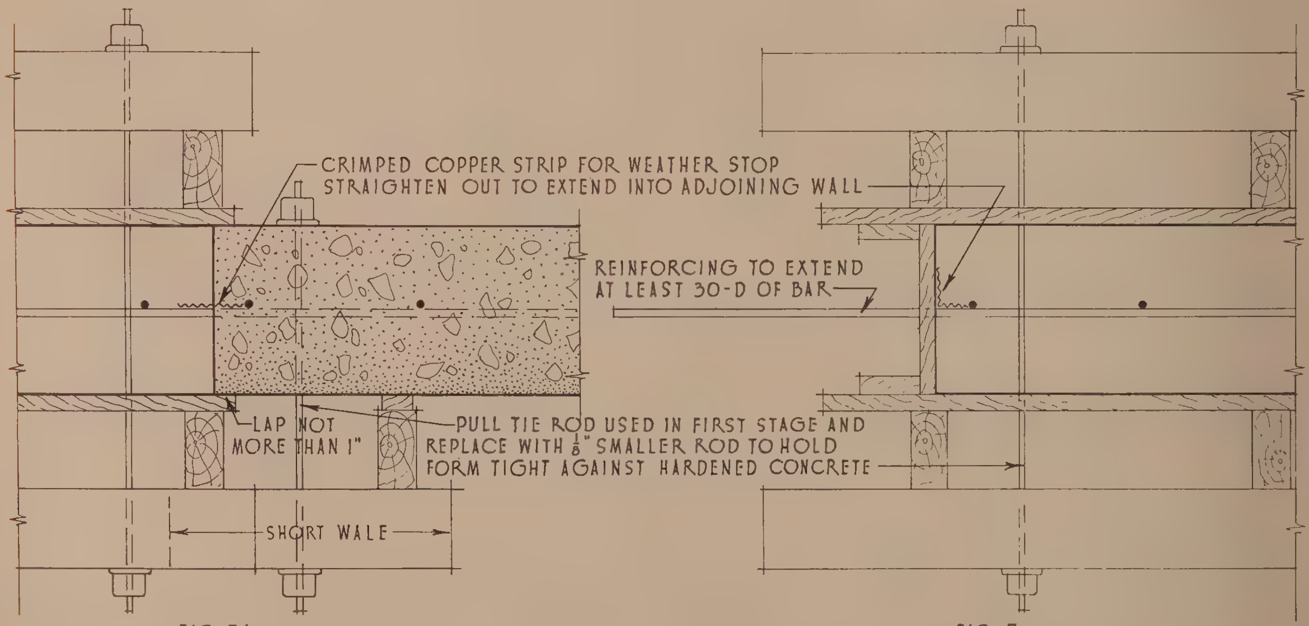
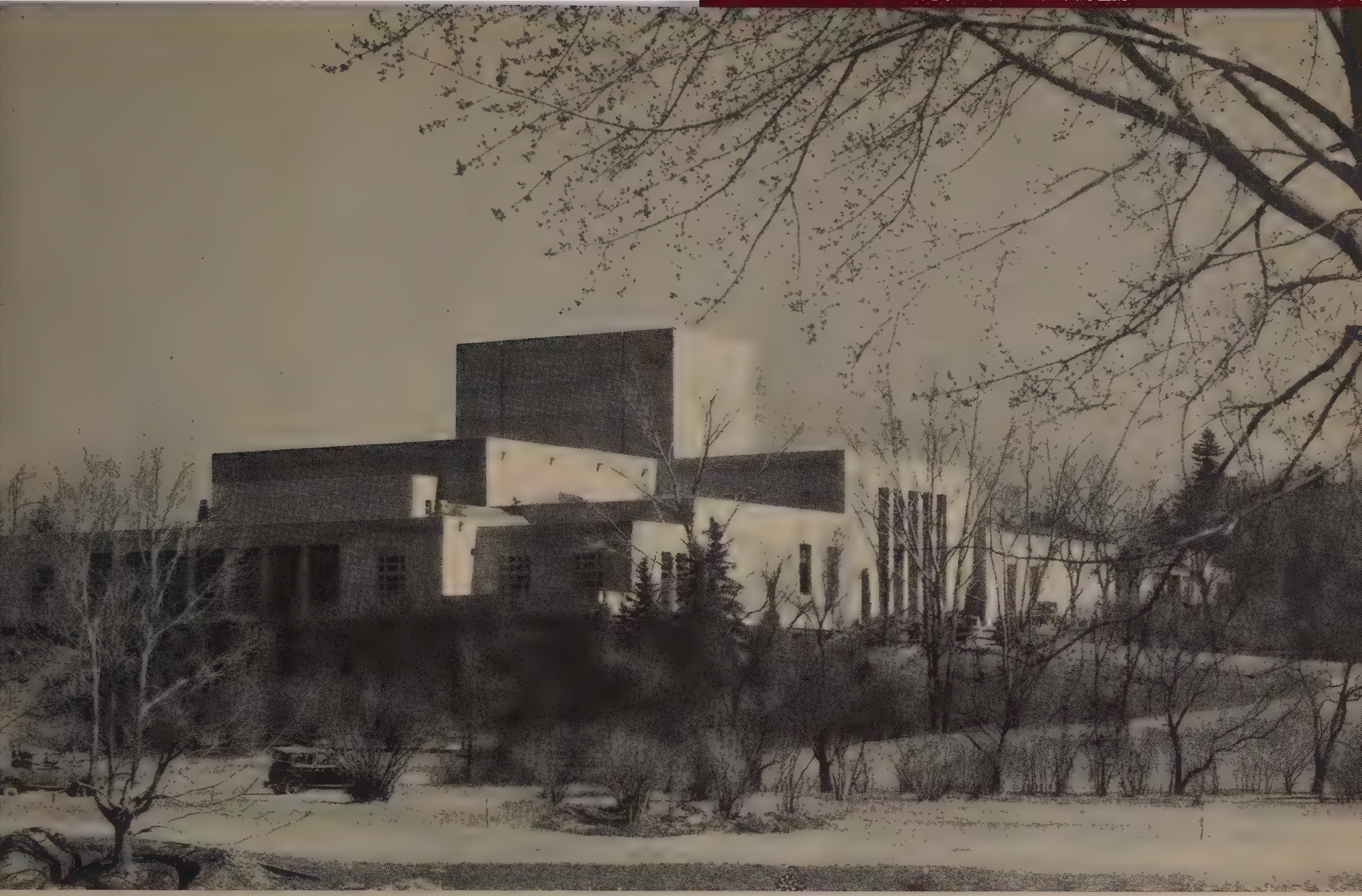

CRIMPED COPPER STRIP FOR WEATHER STOP
STRAIGHTEN OUT TO EXTEND INTO ADJOINING WALL
REINFORCING TO EXTEND AT LEAST 30-D OF BAR
LAP NOT MORE THAN 1"
PULL TIE ROD USED IN FIRST STAGE AND REPLACE WITH ⅛" SMALLER ROD TO HOLD FORM TIGHT AGAINST HARDENED CONCRETE
SHORT WALE

FIG. 7b
SECOND STAGE

FIG. 7a
FIRST STAGE

VERTICAL CONSTRUCTION JOINT IN STRAIGHT WALL



Modern lines tinctured with the spirit of old Southwest architecture produce an appropriate design for Colorado Springs' Fine Arts Center. John Gaw Meem was the architect; Hugo Zehner and E. B. Wood, structural engineers; Platt Rogers, Inc., and George O. Teats were associated contractors.

Planning a Fine Arts Center

By John Gaw Meem, A.I.A.

BROADMOOR Art Academy, one of the most important art schools in the west, had operated for some years in the old Spencer Penrose house located on a rampart overlooking Colorado Springs' Monument Valley Park. Growing steadily, it had reached the point two years ago where expansion of facilities was becoming an emergency matter. Then it was learned that Mrs. F. M. P. Taylor of Colorado Springs was looking for a site on which to erect a museum to house her Indian and Southwest collections and an important Americana Library. Envisioning an opportunity to form an alliance advantageous to both, Broadmoor Academy offered Mrs. Taylor a portion of their land if she, in turn, would provide adequate facilities for the Art Academy. This offer was accepted.

As preliminary plans progressed, the original conception was greatly enlarged by Mrs. Taylor, who sought the addition of a "little theater" to accommodate not less than 400, and a room to house the activities of various musical clubs and organizations in the city. From this enlarged program there developed the idea of a Fine Arts Center which would provide facilities for the creation of artistic works in the fields of painting, sculpture, drama, and music. It was felt that these activities in relation to an expanding museum of American Indian and Southwestern art objects would be of untold value in the production of native American art. It was also desired that the facilities of the

Characteristic board marking enhances the beauty of architectural concrete. No paint was used on the exterior.

Fine Arts Center be made available to the public for educational and cultural purposes by providing necessary galleries for the display of traveling art exhibits and space for dramatic and musical performances.

These various activities fell into four natural groups. It was felt, however, that while each should remain a separate activity, they should function as a whole. The program, as finally developed, comprised the following operating units:

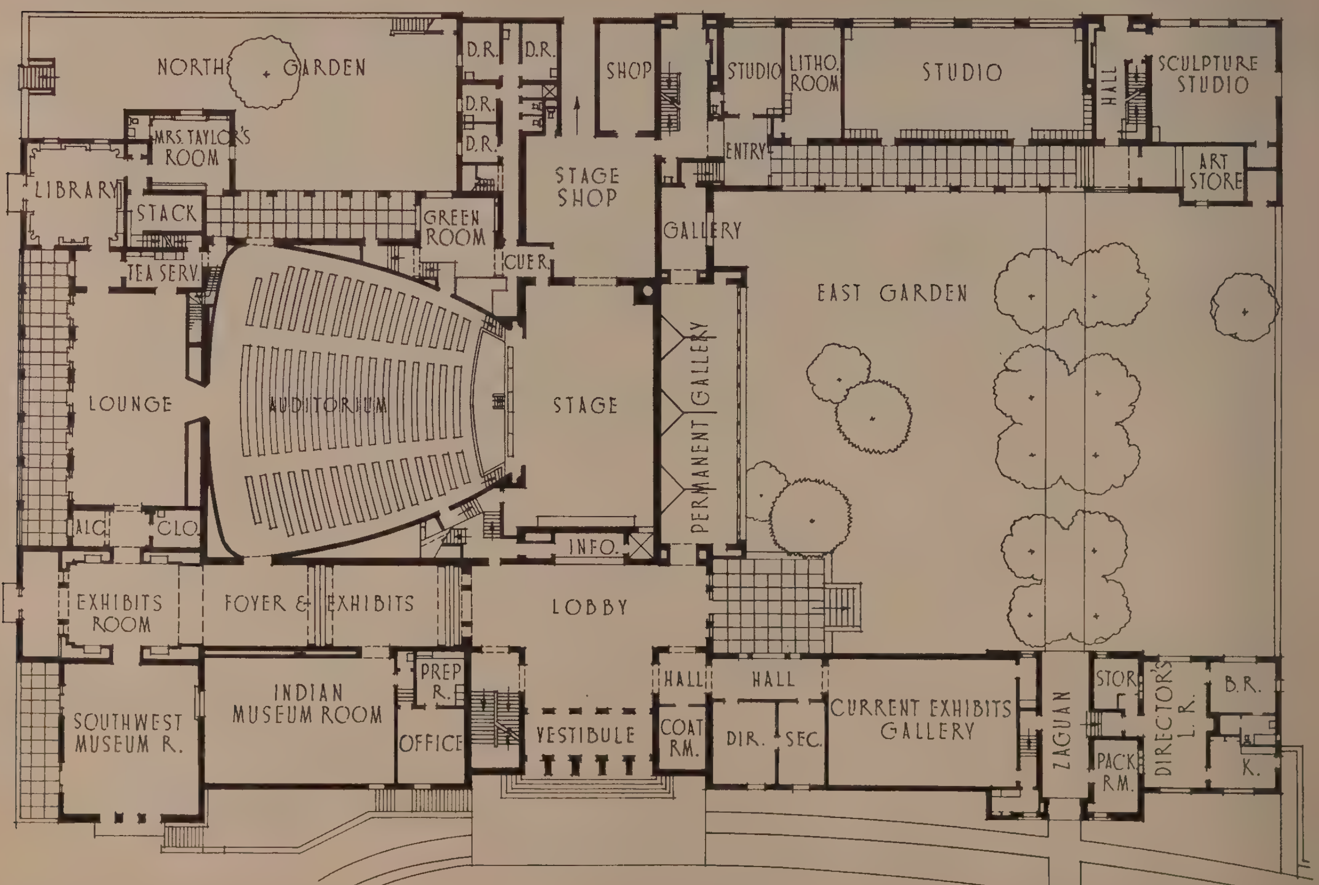
Broadmoor Art Academy, to have two public galleries, a print room, three large instruction studios, numerous private studios, a director's apartment, administrative offices and storage space.

A Little Theater, to seat at least 400 and include a foyer, lounge, complete stage facilities, green room, dressing rooms, costume room, carpenter's shop and storage space.

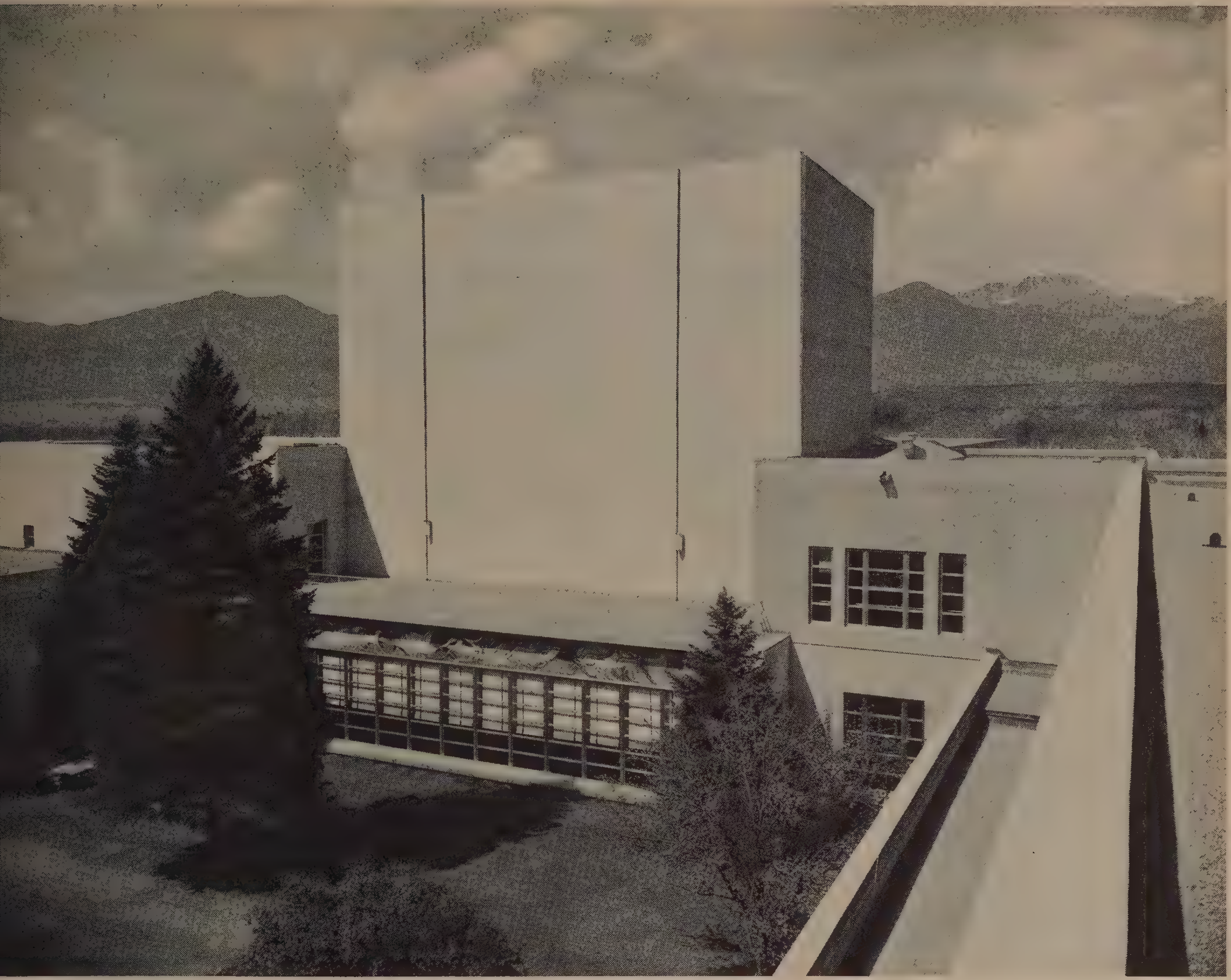
Taylor Museum, to comprise two galleries—one for Indian art and the other for Southwestern art—an Americana Library ~~with~~ stacks for 6,000 volumes, a private room for Mrs. Taylor, curator's offices, preparation and study rooms and ample space for storage.

A Music Room with seating capacity of 125, including music library, stage, dressing room and storage.

To the problem of co-ordinating these different activities under one roof were added other problems presented by the site. The only possible main entrance was to the south



FIRST FLOOR



From any vantage point the enviable setting of the Fine Arts Center forms a beautiful background for the gleaming walls and intriguing design. In the foreground is the East Garden opening from one of the galleries of the Broadmoor Art Academy.

on the only street adjoining the property. The west exposure facing Monument Valley Park presented the best opportunity for display of facade, and an alley on the north provided access for trucks and service exits. It was desirable to preserve an existing garden on the east portion of the lot which bore large, beautiful trees. Garden and mountain views were to be brought into the building as much as possible.

The solution of these problems can best be seen by reference to the plans. The entrance lobby was placed approximately in the center of the south portion of the building. A line through it north and south divides the building into two parts: on the east the Broadmoor Academy is developed around the garden; on the west are the Taylor Museum and the Little Theater opening onto the lobby by means of a foyer. The Music Room was placed directly above the lobby. Thus the public has access to all public portions of the building from the lobby with the least inconvenience to themselves or to the functioning of the various departments of the building.

In the Broadmoor Academy the studios were placed on the north to provide required light and privacy. A private entrance was provided for students through the garden to minimize traffic through the galleries. Both galleries were placed close to the lobby. One has overhead light, the other continuous side light with movable partitions on tracks permitting division into one to four cubicles. This gallery also has artificial overhead lights for night illumination. The print room is adjacent and both rooms have windows on the garden.

The foyer, leading from the lobby, opens into the garden and to a view of Pike's Peak at the other end. Due to the

Foyer, looking toward the garden, is also a gallery.

A hedge of trees frames the west elevation.

The Music Room is located over the main lobby.

One of the many auxiliary entrances.

Detail—in the court.

The lounge ceiling is concrete.

Detail of west balcony.

length of the foyer it is also usable as a picture gallery. From the foyer one enters the galleries of the Taylor Museum, one of which has overhead light and the other side light. The latter opens onto a balcony and terrace.

To reach the library one passes through the lounge of the theater, the lounge opening onto a loggia facing the Park and Pike's Peak. Room is available here for refreshment service. The theater itself is reached through the foyer and lounge and has exits opening onto the north garden.

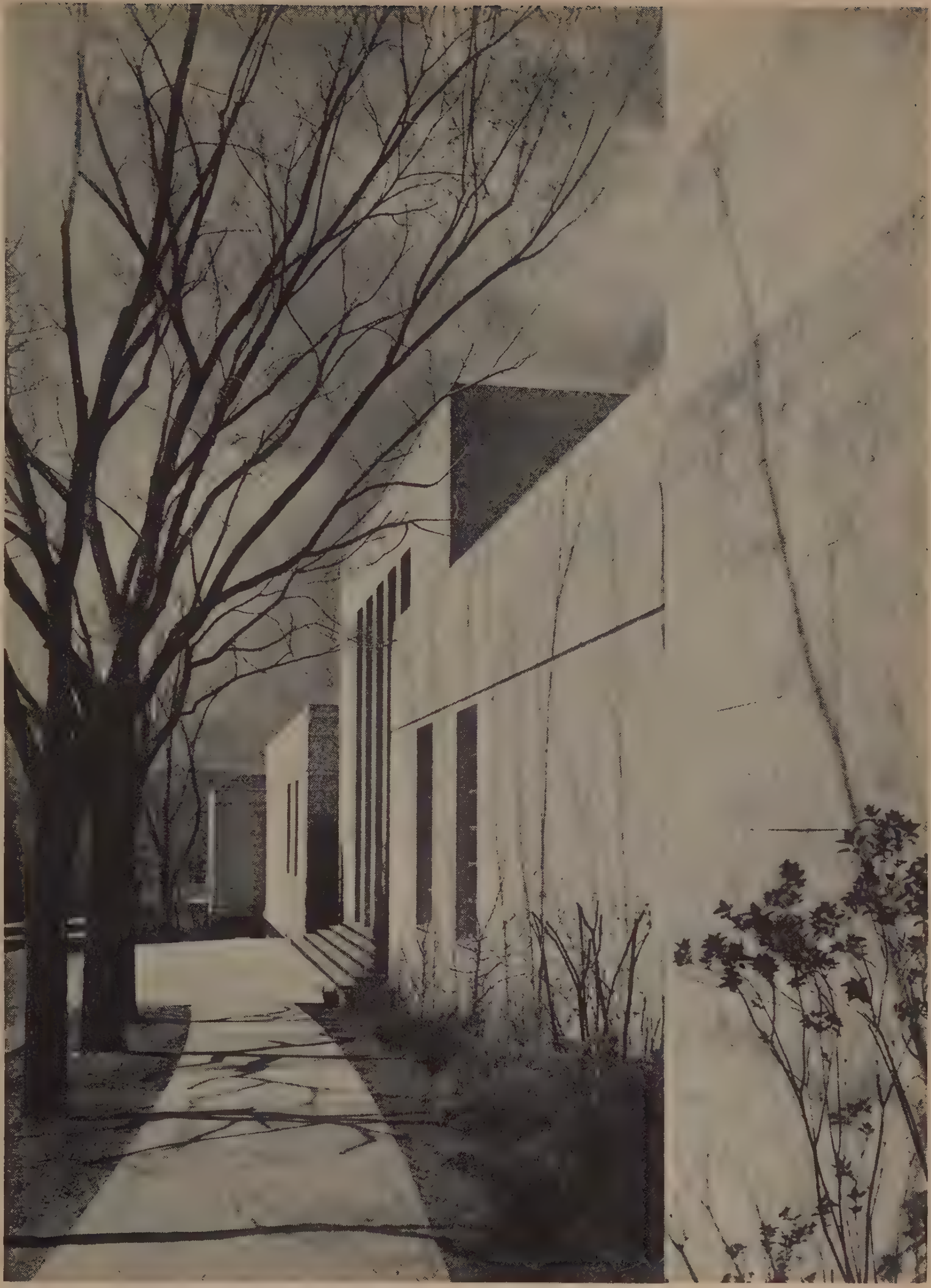
The plan of the theater was naturally based on obtaining best acoustical results. The Flexwood walls, applied on metal lath and plaster over dead air spaces, act as sounding boards. The ceiling is sound absorbent. Dressing rooms, costume room and green room were placed on the North Garden with outside entrances.

The Music Room, above the lobby, has a small stage which connects directly with the theater stage by means of stairs, thus permitting the dressing rooms of the latter to be used when rehearsing in the Music Room. The music library opens onto the East Garden terrace.

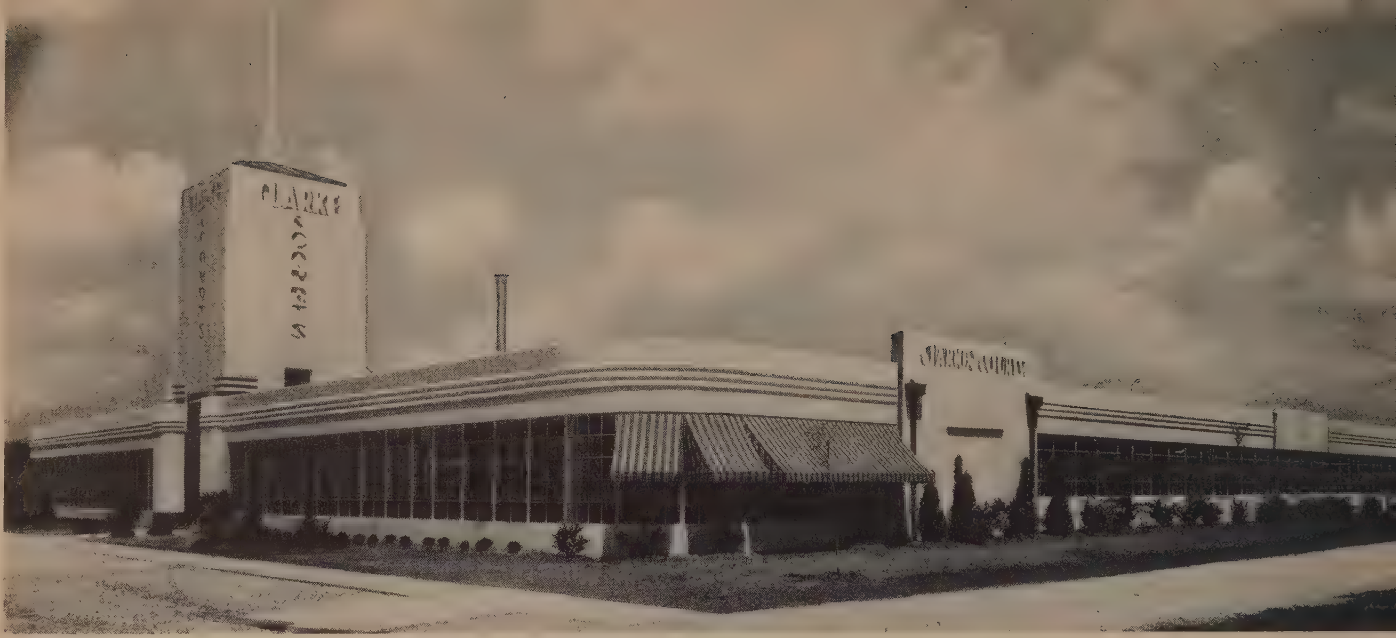
Each elevation of the structure attempts to express the plan as simply as possible. Architectural concrete was selected for execution of the design for economic as well as esthetic reasons. Ornament, where used such as in balconies, railings, gates and light fixtures, is based on American Indian design. It was felt that this, together with the monolithic character of the building, would reflect the Southwestern region of the United States in which it is located and the Indian collection it houses. Exterior fresco spandrel decorations are contemporary paintings by Boardman Robinson and Frank Mechau. It was intended that the primary expression of the building be that of its function and the modern building methods used.

The monolithic concrete exterior, revealing plainly the marks of the wide form boards used, was splendidly executed in keeping with the modern style of the structure. Aside from rubbing certain wall areas to give a more uniform tone, the exterior was left very much as it came from the forms. No painting was considered necessary, since the natural concrete surfaces produce a warmth of color and texture in splendid contrast with the landscaped areas surrounding it.

Erected at a cost of $496,000, the building contains 1,202,399 cu. ft., making the cube cost about 41 cents. Hugo Zehner and E. B. Wood were the structural engineers; Platt Rogers, Inc., and George O. Teats were the contractors.



Main entrance facade, as seen from along the walk, reveals the frank use of concrete to achieve effects of mass. Simple reveals are the only decorative devices.



The design for the Clarke & Courts printing house at Houston, Texas, is characterized by clean lines and an abundance of light. This architectural concrete building was designed by Joseph Finger, Inc., architect; Walter P. Moore was the structural engineer and Southwestern Construction Co., contractor—all of Houston.

The New Industrial Architecture

By Joseph Finger, A.I.A.

INDUSTRIAL buildings, once so universally ugly and unsightly that they depreciated the value of other property surrounding them, are apparently headed for a new role in the civic scene. The old idea that the factory or shop had no other obligation than to shelter manufacturing processes is fast passing; for there is a growing tendency among prospective builders of new plants to demand good looking buildings. There is a threefold reason for this: the advertising value of a fine looking building, free of the stigma of dirt and smoke; the added prestige and good-will value of a building that does not encroach upon the beauty of the community in which it is erected; the improved relations with labor permitted to work in pleasant surroundings.

With the exception of a few industries whose plants, in their functional design, preclude architectural treatment, there is no reason why shops and factories should look so vastly unlike other modern buildings in the community. Industrial requirements for wide areas of windows, simple and economical design, and for durable low maintenance construction are common to all present-day structures—schools, churches or office buildings. When it i recognized that the function of an industrial building ca be expressed beautifully, unsightly design looms as waste opportunity.

Industrial building design, in its new status, has opene wide opportunities for architects in a field in which the have had little chance to work before. With practicall unlimited choice of forms before them, architects for industrial buildings in our day will have few dull moments.

Clarke and Courts, a firm of lithographers, engravers printers and stationers old in the service of Houston Texas, has grown and prospered with the community When need was felt for a new building to shelter an expanding business, it was decided that it should in som way symbolize the graphic arts to which Clarke an Courts had been devoted so many years. The traditiona print shop with dirty windows, cobweb corners and dirt hand towels had no place in this scheme, not even sentimental value. The new building would, it was decided, b a modern structure—as handsome a building as it coul be made, ever mindful that it must reveal its purpose i

The dominating feature of the design is a massive concrete tower with the sign cast integrally with the walls. Plaster molds were used for forming both the projecting and recessed letters.

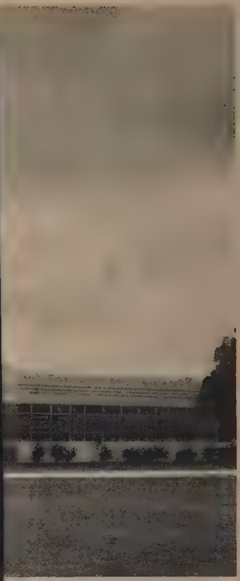
housing the manufacture of quality printed products.

In plan the building is rectangular, with a tower rising near the center of the front facade. Unbroken window areas create a wide horizontal band around the walls. Above the windows is a continuous molded band which emphasizes the monolithic character of the concrete walls and accentuates the strong horizontal feeling. The tower itself rises as a mass, broken at the top by a setback which supports the name "Clarke" cast in relief in plaster molds. Vertically, on the face of the tower, the name "Courts" is recessed into the wall. Aside from a grouping of three fins at each side of the base of the tower above the parapet wall, there is little pure ornamental design. Smooth concrete walls and glass express the chief characteristics of the building—a durable, well lighted printing plant.

Before adopting the type of construction used on this building, considerable thought and study was given to the problem of finding a practical and serviceable building material. A structure covering an area of 45,000 sq. ft., for the most part confined to a single story, it was felt that a continuous, monolithic character was desirable in a material that would avoid penetration of dampness, eliminate unsightly cracks, afford economical construction and at the same time adapt itself to architectural treatment.

Architectural concrete was adopted for all exterior walls and tower. This, combined with steel framing for the tower, was selected as fulfilling the above requirements.

Forms for exterior facing of the walls were lined with plywood cut to sizes and shellacked before erection. Wood moldings were used for the horizontal bands and plaster waste molds for both types of letters on the tower. Every precaution was taken in the design to eliminate cracking



concrete, banded by
all sides.

in the following limits:

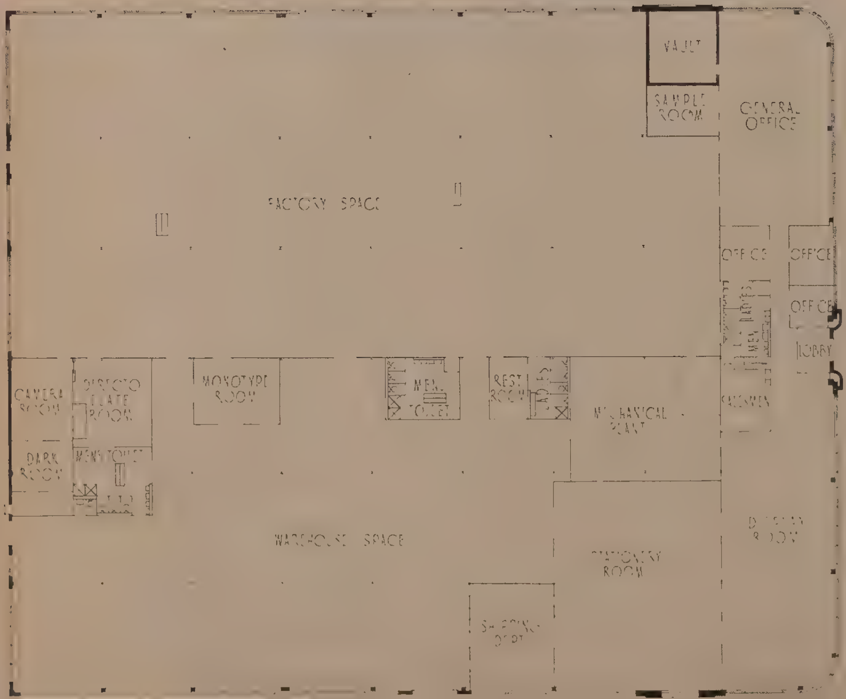
ot less than 90 per cent
ot less than 40 per cent
t more than 75 per cent
t more than 10 per cent

e equivalent of 6 gal. average slump of 6 in. c yard of concrete was strength cement.

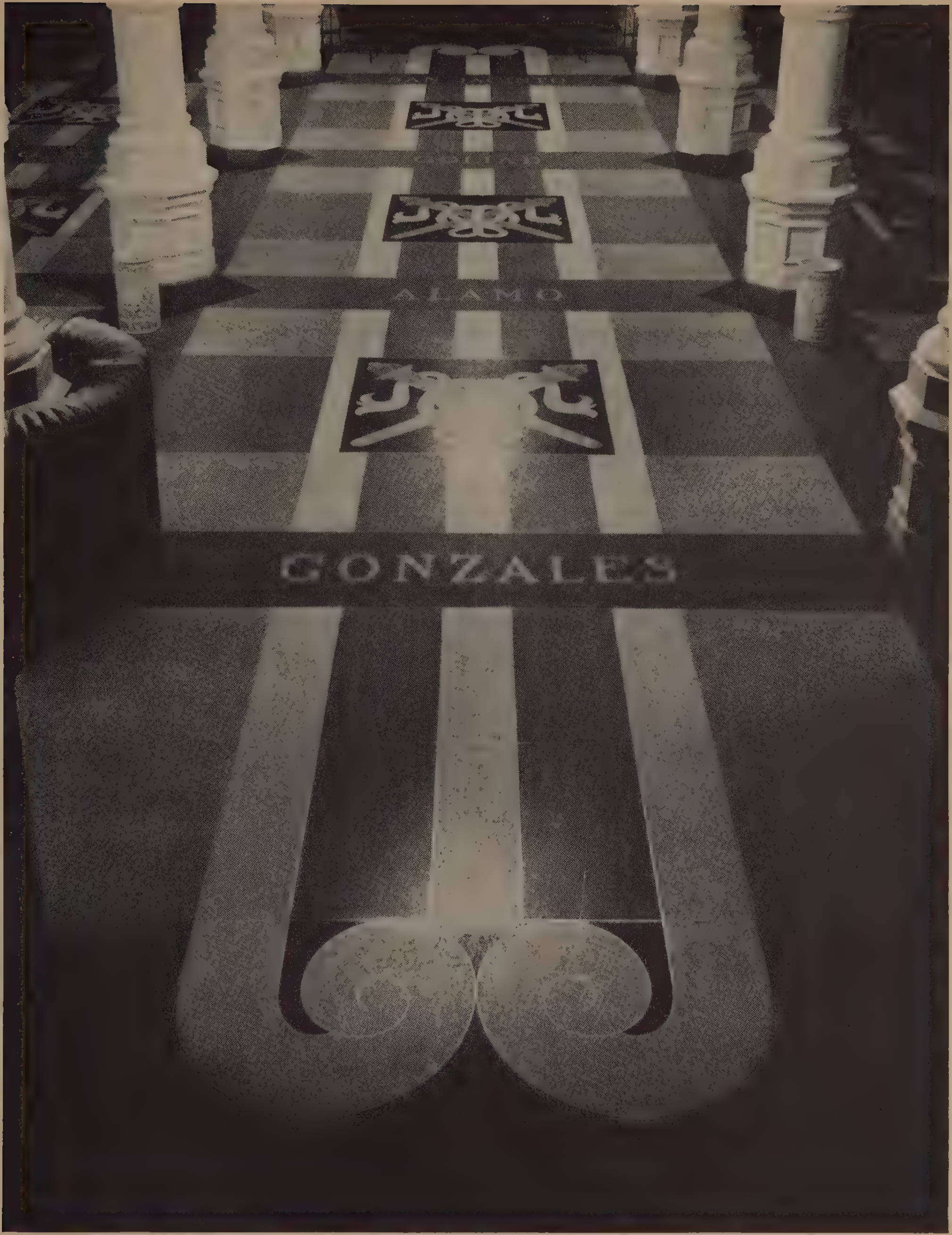
orough puddling of the ration was employed to ooth surface free from ctions were pointed with ushed over with cement pots occurred they were carefully rubbed with carborundum stone. The entire surface was then painted with two coats of cement paint.

The floors, being subject to great wear, are of 6-in. concrete doubly reinforced. Under heavy machinery the floors are 10 in. thick. A splendid wearing surface was obtained with trap rock screenings graded from ⅛ in. down with all dust removed. The topping was mixed in proportion of one part cement to one part trap rock and torpedo sand mixed half and half. The very dry, stiff mix was placed monolithically with the base.

Joseph Finger, Inc. was the architect; Walter P. Moore was the structural engineer; and the contractor for the job was Southwestern Construction Co.—all of Houston.



Four of twelve battles memorialized in terrazzo on the floor of the Texas state capitol are shown in this view through the length of a hall. C. H. Page of Austin was architect. Bubi Jessen prepared sketches for the floor design. J. B. Martina Mosaic Co. of Denver was general contractor for the terrazzo.



Texas History —in Terrazzo

By Edna Collins

TEXAS history, Texas marble, Texas talent combine to make one of the largest and most beautiful terrazzo floors in the world. Under the great dome of the State Capitol it lies—as colorful, as imperishable as Texas history; its design as sweeping and spacious as Texas herself; a thing of beauty, expressing the past, the present and the future for Texans.

The need for such an expression is a real one. The past for Texans is ever proudly present; and as time gathers the history of the state into perspective, they feel an ever increasing pride in the dramatic picture it forms, and a corresponding desire to preserve it for the future.

This pride finds a focus in the great capitol building itself. Three million acres of state lands paid for it 50 years ago. At the time of its completion it was accounted the seventh largest building in the world. The tremendous scale of it is an expression of the immensity of the state, and the graceful dome, of its unity. Within its walls many relics of the Republic are treasured. It is more than a State Capitol to the people of Texas—it is a symbol.

Symbolism is the keynote in the design of the new terrazzo floor. The vital material from the past has been woven into a masterful pattern which is both modern in feeling and harmonious with the ornate classicism of the building. The difficulties of such an accomplishment were extreme. There is as much as 6 in. variation in the spacing of the columns in corridors, and no two bays are exactly alike. These and many other inaccuracies have been cleverly concealed by a design that sweeps them into unity.

The geometric patterns in the corridors derive their first inspiration from use by indicating traffic directions. For the expression of this fundamental of good design, three 12-in. white bands are used, the outer ones beginning and ending in handsome volutes which overlap the point of the center one. These bands are divided by wider ones of black. The tendency of this combination to narrow the 150-ft. east and west corridors has been overcome by breaking the black bands with the red of large squares, widely bordered with yellow, which are laid diagonally and center on the bays between the columns. These warmly contrasting colors are finely harmonized by the use of warm and cool greys in borders of various widths.

When the Texas capitol was erected it was the seventh largest structure in the world.

In the south lobby the design of the floor takes its cue from the memorials which distinguish it. Opposite the entrance stand white marble statues of Sam Houston and Stephen F. Austin. On the east wall hangs a full length portrait of David Crockett and on the west wall a large picture of the Surrender of Santa Anna after the Battle of San Jacinto. Set in the wall on the east side of the entrance to the rotunda is the Declaration of Texas Independence.

To preserve and enlarge this historic spirit, the floor has been designed to include the names of twelve battles fought by Texans. These twelve have been divided into three groups, suggested by the three passages formed by the two rows of supporting columns. For the central passage four battles in the Texas Revolution were chosen: Gonzales, The Alamo, Goliad and San Jacinto. For the flanking passages, four from the Mexican War and four from the Civil War. The lettering is gold on dark grey bands. Between the names are emblems of victory, also in gold, with shaded red flames, and tied about with folds of white ribbon—the whole on a background of black.

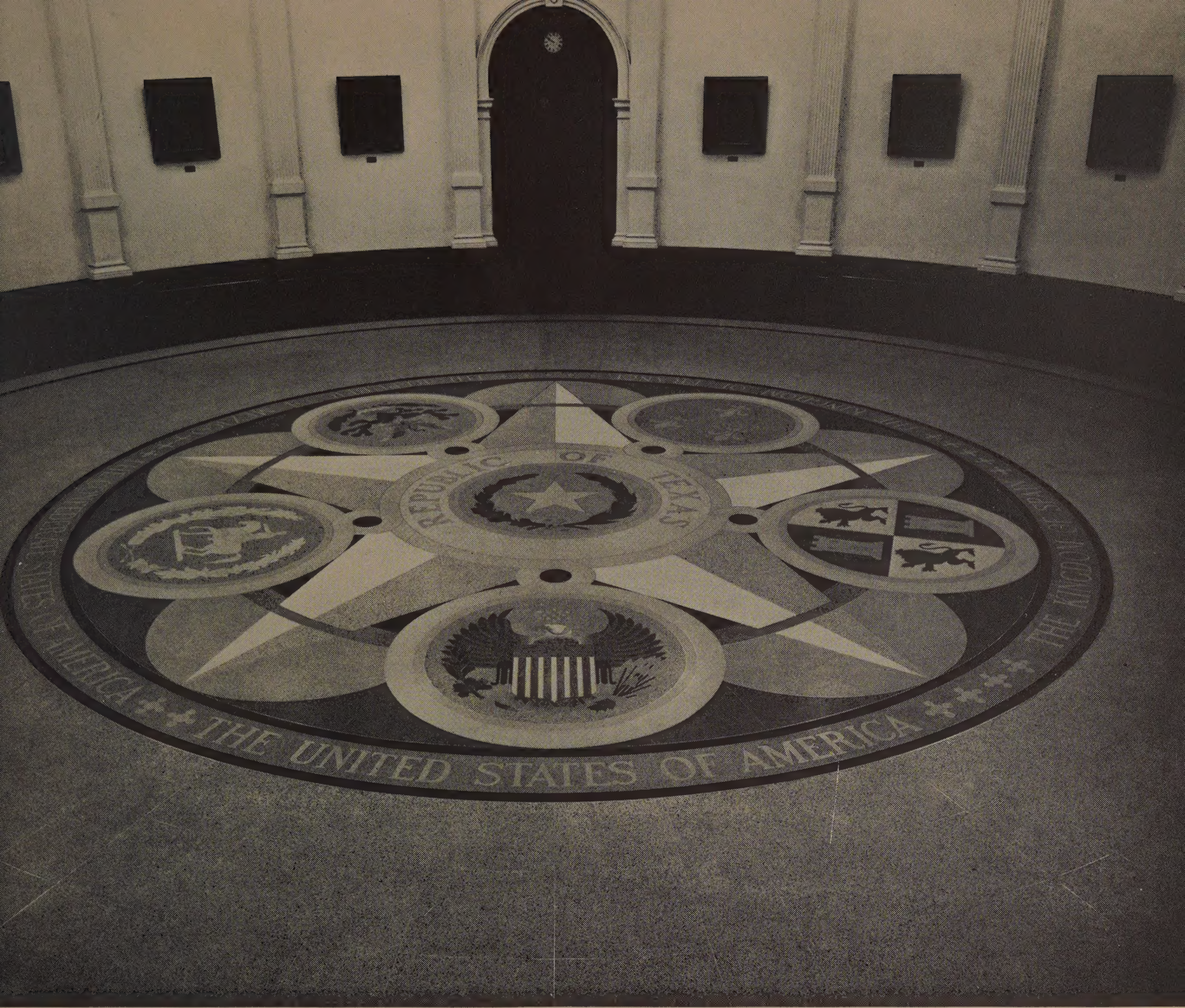
Under each of the three arches leading from this lobby into the rotunda is a geometric design enclosed in a circle. This unit is repeated under each of the other three arches, entering from the east, west and north corridors.

In the center of the 60-ft. rotunda, directly under the dome which soars 311 ft. above it, lies the climax of the whole design. The Lone Star of Texas with the Seal of the Republic in its center spreads its five points in a circle 32 ft. in diameter. Tangent to this circle and to the sides of the points are five smaller circles, each enclosing the coat of arms of one of the nations of which Texas has been a part. The names of these nations have been inserted in the outer circle in gold on a background of rich brown-grey, banded on each side with black. For these the same classic lettering has been used as in the south lobby.

The United States Seal, opposite the south entrance, is the richest in color. The eagle is golden-brown with shaded feathers. The thirteen stripes of the shield are white and intense red, topped by a French blue made of the only imported aggregate used in the floor. The thirteen arrows in the eagle's left claw are gold-headed, and the olive branch in his right is finely executed in shades of green. The head of the eagle is delicately shaded from grey to white, and in his golden beak he holds a ribbon bearing the American motto: "E Pluribus Unum." Above his head are thirteen stars enclosed by clouds. The whole is laid on a blue-grey background.

The Confederate Seal, to continue clockwise around the great circle, seems delicate and chaste. The equestrian statue of George Washington at Richmond and its surrounding wreath of southern products—corn, cotton, tobacco mingled with a variety of flowers—is silver-white on blue. The Motto, "Deo Vindici," is on a gold ribbon. Of the seals, the Mexican is by far the most active in design. The Mexican eagle is in the act of killing a snake. He holds it in his beak and tears it with an outstretched claw, supporting himself with a fluttering of white-tipped wings. The other claw clutches a cactus plant. Half-encircling the eagle are many cactus leaves, each representing a Mexican state. Even the crossed branches of Spanish oak and olive are lively in line. In this seal, as in that of the United States, the colors are shaded in almost every part, creating in both cases the charming quality of fine Byzantine mosaic.

In contrast to the activity of the Mexican Seal, the

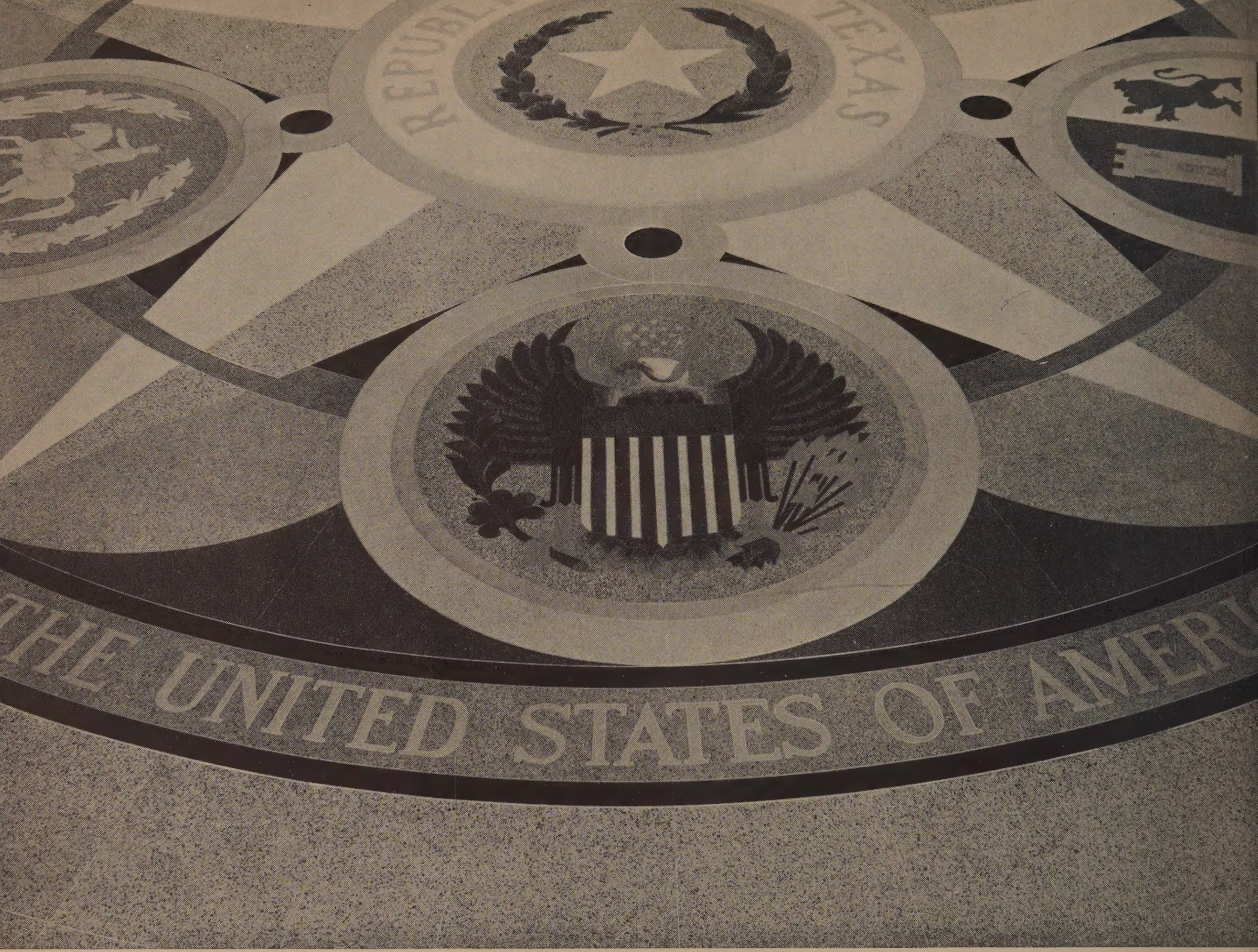


Many colors and shades of natural rock aggregate were used in the terrazzo composition of this "seals of the nations" motif under the great dome. The five nations whose flags have flown over Texas are symbolized here with the seal of the Texas Republic.

arms of the Bourbon Kings of France are reposed and dignified. The three fleurs-de-lis in gold are equally spaced on a field of dark blue giving an effect both simple and formally aloof. To preserve a unity of scale only one quadrant of the Spanish coat of arms was used. This quadrant holds the lions and castles of Castile and Leon, the Spanish lineage of Charles V. The lions are red on silver fields, the castles gold on fields of red.

These five supporting coats of arms are woven together by a continuous border of light yellow that circumscribes each seal and returns to encompass the seal of the Republic of Texas. This is the focal point of the whole design—a symbol of the place it holds in the consciousness of all true Texans. The State Seal, identical except for the words *State* and *Republic*, is at the front entrance. In the center of the seal is the Lone Star, its five points coinciding in direction with those of the big star. Surrounding the silver star are branches of olive and live oak with shaded green leaves, the whole on a field of blue.

Upholding this seal, the large star stretches its points, shaded pale blue and silver, through an intermediate circle determined by the centers of the surrounding seals to the outer border of names. Between this circle and the outer border, segments of circles of the same radii as the



Most brilliantly colored of the national seals is that of the United States in which bright red, blue, white, green and gold aggregates are used against a grey-blue background.

five seals complete the symmetry of the design. In these areas, two shades of red balance the grey-greens and blues of the coats of arms.

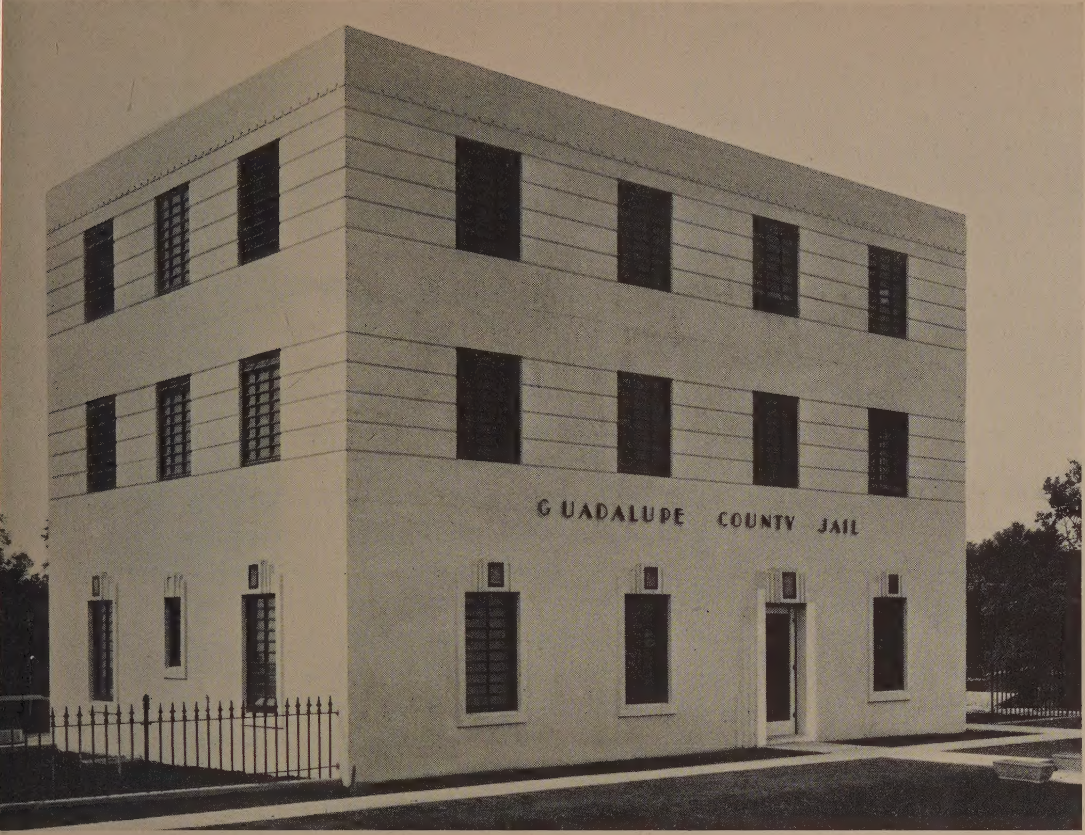
This very complicated design achieves a surprising effect of simplicity, an effect which is increased by looking down from the upper balconies. Surrounded by a wide border of light grey-green, in turn enclosed by narrow bands of yellow, green, dark grey and black, the richness of pattern and color becomes a unit, a single jewel. For this center piece all of the sixteen major colors were used, as well as many mixtures, but they have been combined with such excellent taste that they present an effect both subtle and powerful.

And so, in terrazzo made of Texas marble and portland cement, the romantic story of Texas has been retold for Texans with artistry of design and a modern spirit of fine precision.

The architect for the project was C. H. Page of Austin, and Bubi Jessen prepared the sketches and designs.

J. B. Martina Mosaic Co. of Denver had the general contract. The Art Mosaic and Tile Co. of Toledo, Ohio, did the center piece, and Mr. Second Maraldo was superintendent. Strip designs were done by Pascal Sylvester Co. of Chicago.

Marbles for the terrazzo aggregates were supplied by Edwin Dezendorf of Austin. Through long effort Mr. Dezendorf has discovered many Texas marbles which he now quarries in quantity.



The new Guadalupe County Jail at Seguin, Texas, is completely reinforced concrete. L. M. Wirtz and Harold Calhoun, architects; A. W. Harris, consulting architect; J. W. Beretta Engineers, Inc., did the structural design and Albert Nolte was the contractor.

The Gaol Goes Monolithic

By J. W. Beretta*

IN VIEW of the conspicuous and consistent success which has met the use of architectural concrete construction in a wide variety of buildings, it is not surprising to note its increasing application to jail structures. An outstanding jail has recently been completed in Seguin, Texas, for the County of Guadalupe, from the designs of L. M. Wirtz, A.I.A., and Harold Calhoun, Houston architects, and A. W. Harris, A.I.A., Austin architect, consultant. In this particular structure the use of architectural concrete has revealed advantages which should make it a leading material for jail structures in the future.

The Guadalupe County Jail is designed to solve the criminal detention problems of a community which in size, population and pursuits accurately represents the majority of typical American communities. Attention is usually drawn to buildings because they are large, complicated, costly or unique. Contrary to the usual rule, this structure is notable because of its small size, simplicity, economy and frankness as a sensible and happy solution of the problems at hand. Jails of a similar size and plan should prove ideal solutions of kindred problems in hundreds of localities.

The building is rectangular in plan, three stories in height and 32x45 ft. The first floor is occupied by quarters for the jailer and family, an entrance vestibule and stair well, and a kitchen. Living quarters are provided with an entrance on the opposite side of the building from the entrance to upstairs jail cells. The second floor contains the office, corridors and several tiers of modern cell blocks. The third floor is occupied by special cell blocks for the segregation of negro and white juveniles, negro and white women, hospital and cells for the insane.

Exterior architectural treatment of the building is a frank interpretation of the material used and its modernistic accentuation of horizontal lines in the upper two stories gives a pleasing effect. All exterior forms were lined with oiled plywood, and all horizontal and vertical joints were located under the architect's direction. These form joints were made with such care that a very light rubbing with carborundum bricks served to efface them. Windows and doors on the first floor were given a simple, modern treatment and were provided with recessed lights at the top.

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*J. W. Beretta Engineers, Inc., San Antonio.

Patented wall form ties were used throughout, and their removal left only small holes, easily patched and finished with neat cement grout so that they are practically invisible. The entire exterior is finished with a white cement paint.

Structurally, the design of the building is also straightforward and simple. Fortunate foundation conditions enabled the use of a continuous footing under the walls at a very moderate depth. Exterior walls and wall around the stair well are 8 in. thick, reinforced in the center to simplify the placing of both steel and concrete. This reinforcement consists of continuous, horizontal ½-in. round rods, spaced 14 in. on centers, and ⅜-in. round rods placed vertically on 20-in. centers. Typical wall reinforcement was supplemented with additional reinforcement at all windows and doors consisting of two ⅝-in. round bars placed horizontally and vertically, the bars being 24 in. longer than the opening dimensions. Extra bars were also placed diagonally at the corners of openings. At the corners of the building additional ⅜-in. round bars 6 ft. long were placed between the typical horizontal reinforcement, and four extra vertical bars were also added. All floors and roof slab are of steel pan joist type with tool-resisting steel bars for protection in addition to regular reinforcement.

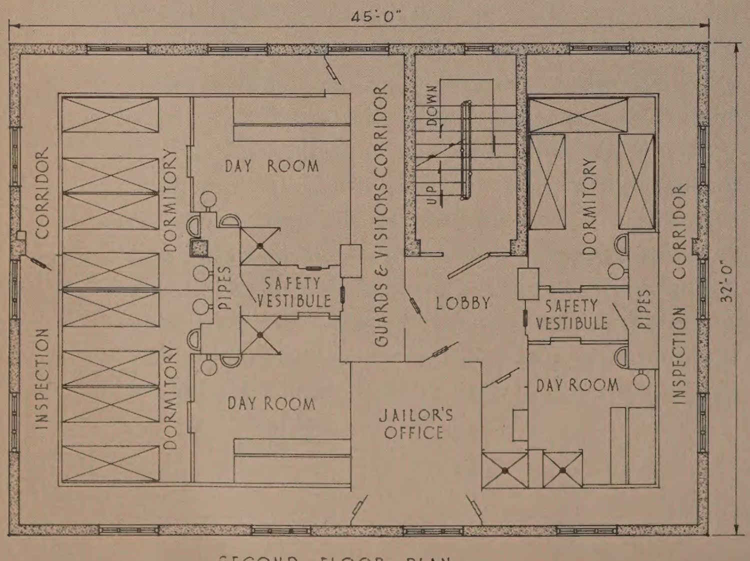
All concrete used on this project was carefully designed according to water-cement ratio method for an ultimate strength of 2,000 pounds at 28 days, and was mixed and placed under careful laboratory control. Aggregates were from local sources, and the mix averaged 1:3:4½, with 7½ gal. water per sack cement. The resulting slump was approximately 6½ in., which gave very workable and satisfactory concrete. In a more severe climate, however, a richer mix and a lower water-cement ratio would have been used to provide greater strength and density to resist freezing and thawing.

In order to secure a properly graded sand it was necessary to mix two different types of local sand in the proportion of 1:2. No vibrators were used on the job but great care was exercised in placing and rodding the concrete. The outside of all wall forms was jarred by hand hammers during placement.

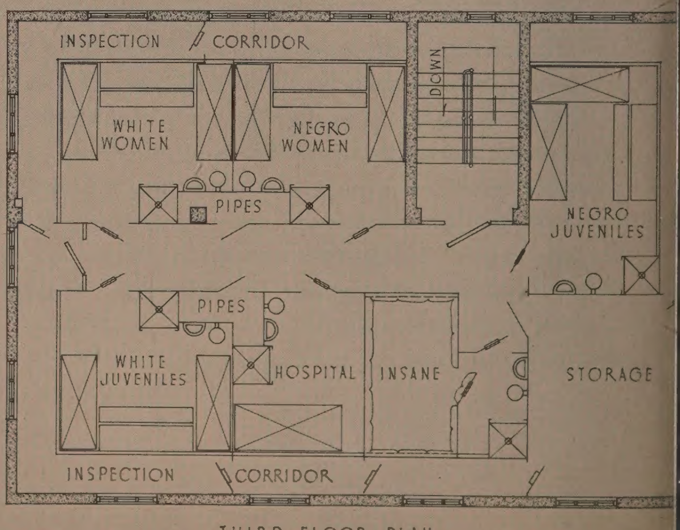
High early strength cement was used for all floors and roof slabs. All cement for walls was standard portland cement. The fabrication of forms and the placing of concrete had to be done with more than usual care because of the accuracy necessary for erection of prison cell work and detention windows. Certain ornament around doors and windows required special attention. The splendid workmanship was attested when all steel work fitted perfectly and no patchwork was necessary on the ornament.

A total of 245 cu. yd. of concrete was used, placed in seven separate runs. Wall construction joints were located at horizontal incised lines in the architectural treatment. All floor slabs were placed monolithically with the adjacent walls. In order to provide for the convenient erection of the jail cell work, it was necessary to omit the placing of stair and landing slabs until the last. Wall forms were blocked out and dowels were provided for the concrete to be placed after the steel work was erected. Leaving the stair well clear proved to be of great assistance in expediting the work of the jail-steel contractor.

The project was financed and constructed under the direction of PWA, represented by A. P. McBrady, engineer-inspector. Albert Nolte, Seguin, was general contractor. The Southwestern Laboratories, San Antonio, handled the design and control of the concrete. Contractor for prison work was the Southern Prison Co., San Antonio. Structural engineering and consultation was by J. W. Beretta Engineers, Inc., of San Antonio. Total cost of the project was about $37,000. Unit cost was 83½ cents per cu. ft. including all installations of prison equipment.



SECOND FLOOR PLAN



THIRD FLOOR PLAN